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## CHAPTER 60

# Musculoskeletal Problems

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### Priority Concepts

Functional Ability; Mobility

#### I. Anatomy and Physiology

##### A. Skeleton

##### 1. Axial portion

- a. Cranium
- b. Vertebrae
- c. Ribs

##### 2. Appendicular portion

- a. Limbs
- b. Shoulders
- c. Hips

##### B. Types of bones: Long, short, flat, irregular

##### 1. Spongy bone

- a. Spongy bone is located in the ends of long bones and the center of flat and irregular bones.
- b. Spongy bone can withstand forces applied in many directions.

##### 2. Dense (compact) bone

- a. Dense bone covers spongy bone.
- b. Forms a cylinder around a central marrow cavity
- c. Better able to withstand longitudinal forces than horizontal forces

##### 3. Characteristics of bones

- a. Support and protect structures of the body
- b. Provide attachments for muscles, tendons, and ligaments
- c. Contain tissue in the central cavities, which aids in the formation of blood cells
- d. Assist in regulating calcium and phosphate concentrations

##### 4. Bone growth

- a. The length of bone growth results from ossification of the epiphyseal cartilage at the ends of bones; bone growth stops between the ages of 18 and 25 years.
- b. The width of bone growth results from the activity of osteoblasts; it occurs throughout life but slows down with aging.



*As aging occurs, bone resorption*

*accelerates, decreasing bone mass and predisposing the client to injury.*

### C. Types of joints (Table 60-1)

#### 1. Characteristics of joints

- a. Allow movement between bones
- b. Formed where 2 bones join
- c. Surfaces are covered with cartilage.
- d. Enclosed in a capsule (synovial joints)
- e. Contain a cavity filled with synovial fluid (synovial joints)
- f. Ligaments hold the bone and joint in the correct position.
- g. Articulation is the meeting point of 2 or more bones.

#### 2. Synovial fluid

- a. Found in the synovial joint capsule
- b. Formed by the synovial membrane, which lines the joint capsule
- c. Lubricates the cartilage
- d. Provides a cushion against shocks

### D. Muscles

#### 1. Characteristics of muscles

- a. Made up of bundles of muscle fibers
- b. Provide the force to move bones
- c. Assist in maintaining posture
- d. Assist with heat production

#### 2. Process of contraction and relaxation

- a. Muscle contraction and relaxation require large amounts of adenosine triphosphate.
- b. Contraction also requires calcium, which functions as a catalyst.
- c. Acetylcholine released by the motor end plate of the motor neuron initiates an action potential.
- d. Acetylcholine is then destroyed by

- acetylcholinesterase.
- e. Calcium is required for muscle fiber contraction and acts as a catalyst for the enzyme needed for the sliding-together action of actin and myosin.
- f. Following contraction, adenosine triphosphate transports calcium out to allow actin and myosin to separate and allow the muscle to relax.

### 3. Skeletal muscles

- a. Skeletal muscles are attached to 2 bones by cartilaginous tendons called *enthuses* (the connective tissue between tendon or ligament and bone).
- b. The point of origin is the point of attachment that does not move.
- c. The point of insertion is the point of attachment that moves when the muscle contracts.
- d. Skeletal muscles act in groups.
- e. Prime movers contract to produce movement.
- f. Antagonists relax.
- g. Synergists contract to stabilize body movement.
- h. Nerves activate and control the muscles.



### E. Bone healing

1. Description: Bone union or healing is the process that occurs after the integrity of a bone is interrupted.
2. Stages ([Fig. 60-1](#))

II. Risk Factors Associated with Musculoskeletal Problems: See [Box 60-1](#) for more information

III. Diagnostic Tests

A. Radiography and magnetic resonance imaging (MRI) (refer to [Chapter 58](#) for information on MRI)

1. Description: Radiography and MRI are commonly used procedures to diagnose problems of the musculoskeletal system.



### 2. Interventions

- a. Handle injured areas carefully and support extremities above and below the joint.
- b. Administer analgesics as prescribed before the procedure, particularly if

- the client is in pain.
- c. Remove any radiopaque and metallic objects, such as jewelry.
- d. Ask the client if she is pregnant; MRI may be contraindicated in pregnancy.
- e. Shield the client's testes, ovaries, or pregnant abdomen.
- f. The client must lie still during a procedure.
- g. Inform the client that exposure to radiation from radiography is minimal and not dangerous.
- h. The health care provider wears a lead apron if staying in the room with the client having radiography.
- i. Complete the screening process per agency policy.

## B. Arthrocentesis

1. Description: Arthrocentesis is used to diagnose joint inflammation and infection.

- a. Arthrocentesis involves aspirating synovial fluid, blood, or pus via a needle inserted into a joint cavity.
- b. Medication, such as corticosteroids, may be instilled into the joint if necessary to alleviate inflammation.



## 2. Interventions

- a. Ensure that informed consent has been obtained.
- b. Apply an elastic compression bandage postprocedure as prescribed.
- c. Use ice to decrease pain and swelling.
- d. Pain may worsen after aspirating fluid from the joint; analgesics may be prescribed.
- e. Pain can continue for up to 2 days after administration of corticosteroids into a joint.
- f. Instruct the client to rest the joint for 8 to 24 hours postprocedure.
- g. Instruct the client to notify the primary health care provider (PHCP) if a fever or swelling of the joint occurs.

## C. Arthroscopy

1. Description: Used to diagnose and treat acute and chronic problems of the joint.

- a. Arthroscopy provides an endoscopic

examination of various joints.

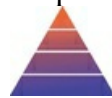
- b. Articular cartilage abnormalities can be assessed, loose bodies removed, and the cartilage trimmed.
- c. A biopsy may be performed during the procedure.

## 2. Interventions

- a. Instruct the client to fast for 8 to 12 hours before the procedure.
- b. Ensure that informed consent was obtained.
- c. Administer pain medication as prescribed postprocedure.



- d. Assess the neurovascular status of the affected extremity.
- e. An elastic compression bandage should be worn postprocedure for 2 to 4 days as prescribed.
- f. Instruct the client that walking with weight-bearing usually is permitted after sensation returns but to limit activity for 1 to 4 days as prescribed following the procedure.
- g. Instruct the client to elevate the extremity as often as possible for 24 hours following the procedure and to place ice on the site to minimize swelling for 12 to 24 hours postprocedure.



- h. Advise the client to notify the PHCP if fever or increased knee pain occurs or if edema continues for more than 3 days postprocedure.

## D. Bone mineral density measurements

### 1. Dual-energy x-ray absorptiometry

- a. Dual-energy x-ray absorptiometry measures the bone mass of the spine, wrist and hip bones, and total body.
- b. Radiation exposure is minimal.
- c. It is used to diagnose metabolic bone disease and to monitor changes in bone density with treatment.
- d. Inform the client that the procedure is painless.



e. All metallic objects are removed before the test.

## 2. Quantitative ultrasound

- a. Quantitative ultrasound evaluates strength, density, and elasticity of various bones, using ultrasound rather than radiation.
- b. Inform the client that the procedure is painless.

## E. Bone scan

1. Description: A bone scan is used to identify, evaluate, and stage bone cancer before and after treatment; it is also used to detect fractures.

- a. Radioisotope is injected intravenously and will collect in areas that indicate abnormal bone metabolism and some fractures, if they exist.
- b. The isotope is excreted in the urine and feces within 48 hours and is not harmful to others.

## 2. Interventions

- a. Food and fluids may be withheld before the procedure.
- b. Ensure that informed consent has been obtained.
- c. Remove all jewelry and metal objects.



d. Following the injection of the

radioisotope, the client must drink 32 oz of water (if not contraindicated) to promote renal filtering of the excess isotope.

- e. From 1 to 3 hours after the injection, have the client void to clear excess isotope from the bladder before the scanning procedure is completed.
- f. Inform the client of the need to lie supine during the procedure and that the procedure is not painful.
- g. Monitor the injection site for redness and swelling.
- h. Encourage oral fluid intake following the procedure.



*No special precautions are required after a*

*bone scan, because only a minimal amount of radioactivity exists in the radioisotope used for the procedure.*

#### F. Bone or muscle biopsy

1. Description: Biopsy may be done during surgery or through aspiration or punch or needle biopsy.

##### 2. Interventions

a. Ensure that informed consent was obtained.



b. Monitor for bleeding, swelling,

hematoma, or severe pain.

c. Elevate the site for 24 hours following the procedure to reduce edema.

d. Apply ice packs as prescribed following the procedure to prevent the development of a hematoma and to decrease site discomfort.

e. Monitor for signs of infection following the procedure.

f. Inform the client that mild to moderate discomfort is normal following the procedure.

#### G. Electromyography (EMG)

1. Description: EMG is used to evaluate muscle weakness.

a. Electromyography measures electrical potential associated with skeletal muscle contractions.

b. Needles are inserted into the muscle, and recordings of muscular electrical activity are traced on recording paper through an oscilloscope.



##### 2. Interventions

a. Ensure that informed consent was obtained.

b. Instruct the client that the needle insertion is uncomfortable.

c. Instruct the client not to take any stimulants or sedatives for 24 hours before the procedure.

d. Inform the client that slight bruising may occur at the needle insertion sites.

e. Mild analgesics can be used for the pain.

### IV. Injuries

#### A. Strains

1. Strains are an excessive stretching of a muscle or tendon.
2. Management involves cold and heat applications, exercise with activity limitations, antiinflammatory medications, and muscle relaxants.
3. Surgical repair may be required for a severe strain (ruptured muscle or tendon).

#### B. Sprains

1. Sprains are an excessive stretching of a ligament, usually caused by a twisting motion, such as in a fall or stepping onto an uneven surface.
2. Sprains are characterized by pain and swelling.



3. Management involves rest, ice, a compression bandage, and elevation (RICE) to reduce swelling, as well as joint support. RICE is considered a first-aid treatment, rather than a cure for soft tissue injuries.
4. Casting may be required for moderate sprains to allow the tear to heal.
5. Surgery may be necessary for severe ligament damage.

#### C. Rotator cuff injuries

1. The musculotendinous or rotator cuff of the shoulder can sustain a tear, usually as a result of trauma.
2. Injury is characterized by shoulder pain and the inability to maintain abduction of the arm at the shoulder (drop arm test).

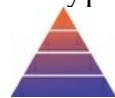


3. Management involves nonsteroidal anti-inflammatory drugs (NSAIDs), physical therapy, sling support, and ice-heat applications.
4. Surgery may be required if medical management is unsuccessful or a complete tear is present.

### V. Fractures

A. Description: A break in the continuity of the bone caused by trauma, twisting as a result of muscle spasm or indirect loss of leverage, or bone decalcification and disease that result in osteopenia.

B. Types of fractures ([Box 60-2](#))



C. Assessment of a fracture of an extremity

1. Pain or tenderness over the involved area
2. Decrease or loss of muscular strength or function
3. Obvious deformity of the affected area
4. Crepitation, erythema, edema, or bruising
5. Muscle spasm and neurovascular impairment



D. Initial care of a fracture of an extremity



1. Immobilize the affected extremity with a cast or splint.
2. Assess the neurovascular status of the extremity.
3. Interventions for a fracture: **Reduction, fixation, traction, cast**



*If a compound (open) fracture exists, splint the extremity and cover the wound with a sterile dressing.*

E. Reduction restores the bone to proper alignment.

1. Closed reduction is a nonsurgical intervention performed by manual manipulation.
  - a. Closed reduction may be performed under local or general anesthesia.
  - b. A cast may be applied following reduction.
2. Open reduction involves a surgical intervention; the fracture may be treated with **internal fixation** devices.

F. Fixation

1. Internal fixation follows an open reduction ([Fig. 60-2](#)).
  - a. Internal fixation involves the application of screws, plates, pins, wires, or intramedullary rods to hold the fragments in alignment.
  - b. Internal fixation may involve the removal of damaged bone and replacement with a prosthesis.
  - c. Internal fixation provides immediate bone stabilization.
2. **External fixation** is the use of an external frame to stabilize a fracture by attaching skeletal pins through bone fragments to a rigid external support ([Fig. 60-3](#)).
  - a. External fixation provides more freedom of movement than with traction.
  - b. Monitor pin stability and provide pin care to decrease infection risks.
  - c. Risk of infection exists with both fixation methods.
  - d. External fixation is commonly used when massive tissue trauma is present.

G. Traction ([Fig. 60-4](#))

1. Description

- a. Traction is the exertion of a pulling force applied in 2 directions to reduce and immobilize a fracture.
- b. It provides proper bone alignment and

reduces muscle spasms.



## 2. Interventions

- a. Maintain proper body alignment.
- b. Ensure that the weights hang freely and do not touch the floor.
- c. Do not remove or lift the weights without a PHCP's prescription.
- d. Ensure that pulleys are not obstructed and that ropes in the pulleys move freely.
- e. Place knots in the ropes to prevent slipping.
- f. Check the ropes for fraying.

## H. Skeletal traction

### 1. Description

- a. Traction is applied mechanically to the bone with pins, wires, or tongs.
- b. Typical weight for skeletal traction is 25 to 40 lb (11 to 18 kg).



### 2. Interventions

- a. Monitor color, motion, and sensation of the affected extremity.
  - b. Monitor the insertion sites for redness, swelling, drainage, or increased pain.
  - c. Provide insertion site care as prescribed.
3. Cervical tongs and a halo fixation device: See [Chapter 58](#) regarding care of the client with these types of devices.

## I. Skin traction

1. Description: Skin traction is applied by using elastic bandages or adhesive, foam boot, or sling.
2. Cervical skin traction relieves muscle spasms and compression in the upper extremities and neck (see [Fig. 60-4](#)).

- a. Cervical skin traction uses a head halter and chin pad to attach the traction.
- b. Use powder to protect the ears from friction rub.



- c. Position the client with the head of the bed elevated 30 to 40 degrees, and attach the weights to a pulley system over the head of the bed.
3. Buck's (extension) skin traction is used to alleviate muscle spasms and immobilize a lower limb by

maintaining a straight pull on the limb with the use of weights (see [Fig. 60-4](#)).

a. A boot appliance is applied to attach to the traction.



b. The weights are attached to a

pulley; allow the weights to hang freely over the edge of bed.

c. Not more than 8 to 10 lb (3.5 to 4.5 kg) of weight should be applied as prescribed.

d. Elevate the foot of the bed to provide the traction.

4. Russell's skin (sling) traction: See [Fig. 60-4](#) and [Chapter 39](#) regarding this type of traction.

5. Pelvic skin traction is used to relieve low back, hip, or leg pain or to reduce muscle spasm (see [Fig. 60-4](#)).



a. Apply the traction belt snugly

over the pelvis and iliac crest and attach to the weights.

b. Use measures as prescribed to prevent the client from slipping down in bed.

J. Balanced suspension traction (see [Fig. 60-4](#))

1. Description

a. Balanced suspension traction is used with skin or skeletal traction.

b. Used to approximate fractures of the femur, tibia, or fibula

c. Balanced suspension traction is produced by a counterforce other than the client.



2. Interventions

a. Position the client in a low-Fowler's position on either the side or the back.

b. Maintain a 20-degree angle from the thigh to the bed.

c. Protect the skin from breakdown.

d. Provide pin care if pins are used with skeletal traction.

e. Clean the pin sites with sterile normal saline and hydrogen peroxide or povidone-iodine as prescribed or per agency policy.

K. Casts

1. Description: Plaster, fiberglass, or air casts are used to immobilize bones and joints into correct alignment

after a fracture or injury.



## 2. Interventions

- a. Keep the cast and extremity elevated.
- b. Allow a wet plaster cast 24 to 72 hours to dry (synthetic casts dry in 20 minutes).
- c. Handle a wet plaster cast with the palms of the hands (not fingertips) until dry.
- d. Turn the extremity every 1 to 2 hours, unless contraindicated, to allow air circulation and promote drying of the cast.
- e. A hair dryer can be used on a cool setting to dry a plaster cast (heat cannot be used on a plaster cast, because the cast heats up and burns the skin).
- f. Monitor closely for circulatory impairment; prepare for bivalving or cutting the cast if circulatory impairment occurs.
- g. Petal the cast or apply moleskin to the edges to protect the client's skin; maintain smooth edges around the cast to prevent crumbling of the cast material.
- h. Monitor for signs of infection such as increased temperature, hot spots on the cast, foul odor, or changes in pain.
- i. If an open draining area exists on the affected extremity, the PHCP will make a cutout portion of the cast known as a *window*, for assessment and wound care purposes.
- j. Instruct the client not to stick objects inside the cast.
- k. Teach the client to keep the cast clean and dry.
- l. Instruct the client in isometric exercises to prevent muscle atrophy.



*Monitor a casted extremity for circulatory*

*impairment such as pain, swelling, discoloration, tingling, numbness, coolness, or diminished pulse. Notify the PHCP immediately if circulatory*

*compromise occurs.*



## VI. Complications of Fractures (Box 60-3)

### A. Fat embolism (see [Priority Nursing Actions](#))

#### Priority Nursing Actions

##### Fat Embolism in a Client Following a Fracture

1. Notify the primary health care provider (PHCP).
2. Administer oxygen.
3. Administer intravenous (IV) fluids as prescribed.
4. Monitor vital signs and respiratory status.
5. Prepare for intubation and mechanical ventilation if necessary as indicated by arterial blood gas values.
6. Follow up on results of diagnostic tests such as chest x-ray or computed tomography (CT) scan.
7. Document the event, actions taken, and the client's response.

#### Reference

Ignatavicius, Workman, Rebar (2018), p. 1034.

### B. Pulmonary embolism

1. Description: Pulmonary embolism is caused by the movement of foreign particles (blood clot, fat, or air) into the pulmonary circulation.
2. Assessment
  - a. Restlessness and apprehension
  - b. Sudden onset of dyspnea and chest pain
  - c. Cough, hemoptysis, hypoxemia, or crackles
3. Interventions
  - a. Notify the PHCP immediately if signs of emboli are present.
  - b. Administer oxygen and other prescriptions; intravenous (IV) anticoagulant therapy may be prescribed.

### C. Compartment syndrome

1. Description
  - a. Tough fascia surrounds muscle groups, forming compartments from which arteries, veins, and nerves enter and exit at opposite ends.
  - b. Compartment syndrome occurs when pressure increases within 1 or more compartments, leading to decreased blood flow, tissue ischemia, and

- neurovascular impairment.
- c. Neurovascular damage may be irreversible if not treated within 4 to 6 hours after the onset of compartment syndrome.

## 2. Assessment

- a. Unrelieved or increased pain in the limb
- b. Tissue that is distal to the involved area becomes pale, dusky, or edematous.
- c. Pain with passive movement
- d. Loss of sensation (paresthesia)
- e. Pulselessness (a late sign)

## 3. Interventions

- a. Notify the PHCP immediately and prepare to assist the PHCP.
- b. Continue to elevate the affected extremity.
- c. If severe, assist the PHCP with fasciotomy to relieve pressure and restore tissue perfusion.
- d. Loosen tight dressings or bivalve restrictive cast as prescribed.

## D. Infection and osteomyelitis

1. Description: Infection and osteomyelitis (inflammatory response in bone tissue) can be caused by the introduction of organisms into bones leading to localized bone infection.

## 2. Assessment

- a. Tachycardia and fever (usually above 101° F [38.3° C]).
- b. Erythema and pain in the area surrounding the infection
- c. Leukocytosis and elevated erythrocyte sedimentation rate (ESR)
- d. Confirmed by radiographic assessment, such as plain radiographs, MRI, or bone scan

## 3. Interventions

- a. Notify the PHCP.
- b. Prepare to initiate aggressive, long-term IV antibiotic therapy. A central venous access line will likely be required.
- c. Surgery is performed for resistant osteomyelitis with sequestrectomy and/or bone grafts.
- d. For unrelenting infection and osteomyelitis, hyperbaric oxygen

therapy is used (if available) to promote healing.

#### E. Avascular necrosis

1. Description: Avascular necrosis occurs when a fracture interrupts the blood supply to a section of bone, leading to bone death.
2. Assessment
  - a. Pain
  - b. Decreased sensation
  - c. Confirmed by radiographic assessment, such as plain radiographs, MRI, or bone scan
3. Interventions
  - a. Notify the PHCP if pain or numbness occurs.
  - b. Prepare the client for removal of necrotic tissue, because it serves as a focus for infection.

### VII. Crutch Walking



#### A. Description

1. An accurate measurement of the client for crutches is important, because an incorrect measurement could damage the brachial plexus.
2. The distance between the axillae and the arm pieces on the crutches should be 2 to 3 fingerwidths in the axilla space.
3. The elbows should be slightly flexed, 20 to 30 degrees, when the client is walking.
4. When ambulating with the client, stand on the affected side.
5. Instruct the client never to rest the axillae on the axillary bars.
6. Instruct the client to look up and outward when ambulating and to place the crutches 6 to 10 inches (25.5 cm) diagonally in front of the foot.
7. Instruct the client to stop ambulation if numbness or tingling in the hands or arms occurs.

#### B. Crutch gaits ([Table 60-2](#))



#### C. Assisting the client with crutches to sit and stand

1. Place the unaffected leg against the front of the chair.
2. Move the crutches to the affected side, and grasp the arm of the chair with the hand on the unaffected side.
3. Flex the knee of the unaffected leg to lower self into the chair while placing the affected leg straight out in front.

4. Reverse the steps to move from a sitting to standing position.



#### D. Going up and down stairs

1. Up the stairs
  - a. The client moves the unaffected leg up first.
  - b. The client moves the affected leg and the crutches up.
2. Down the stairs
  - a. The client moves the crutches and the affected leg down.
  - b. The client moves the unaffected leg down.

### VIII. Canes and Walkers

A. Description: Canes and walkers are made of a lightweight material with a rubber tip at the bottom.



#### B. Interventions

1. Stand at the affected side of the client when ambulating; use of a gait or transfer belt may be necessary.
2. The handle should be at the level of the client's greater trochanter.
3. The client's elbow should be flexed at a 15- to 30-degree angle.
4. Instruct the client to hold the cane 4 to 6 inches (10 to 15 cm) to the side of the foot.
5. Instruct the client to hold the cane in the hand on the unaffected side so that the cane and weaker leg can work together with each step.
6. Instruct the client to move the cane at the same time as the affected leg.
7. Instruct the client to inspect the rubber tips regularly for worn places.

#### C. Hemicanes or quadripod canes

1. Hemicanes or quadripod canes are used for clients who have the use of only 1 upper extremity.
2. Hemicanes provide more security than a quadripod cane; however, both types provide more security than a single-tipped cane.
3. Position the cane at the client's unaffected side, with the straight, nonangled side adjacent to the body.
4. Position the cane 6 inches (15 cm) from the unaffected client's side, with the hand grip level with the greater trochanter.





#### D. Walker

1. Stand adjacent to the client on the affected side.
2. Instruct the client to put all 4 points of the walker flat on the floor before putting weight on the hand pieces.
3. Instruct the client to move the walker forward, followed by the affected or weaker foot and then the unaffected foot.



*Safety is the priority concern when the client uses an assistive device such as a cane, walker, or crutches. Be sure that the client demonstrates correct use of the device.*

### IX. Fractured Hip

#### A. Types

1. Intracapsular (femoral head is broken within the joint capsule)
  - a. Femoral head and neck receive decreased blood supply and heal slowly.
  - b. Skin traction is applied preoperatively to reduce the fracture and decrease muscle spasms.
  - c. Treatment includes a total hip replacement or open reduction internal fixation (ORIF) with femoral head replacement.
  - d. To prevent hip displacement postoperatively, avoid extreme hip flexion, and check the surgeon's prescriptions regarding positioning.
2. Extracapsular (fracture is outside the joint capsule)
  - a. Fracture can occur at the greater trochanter or can be an intertrochanteric fracture.
  - b. Preoperative treatment includes balanced suspension or skin traction to relieve muscle spasms and reduce pain.
  - c. Surgical treatment includes ORIF with nail plate, screws, pins, or wires.



#### B. Postoperative interventions

1. Monitor for signs of delirium and institute safety measures.
2. Maintain leg and hip in proper alignment and prevent internal or external rotation; avoid extreme hip

- flexion.
3. Follow the PHCP's prescriptions regarding turning and repositioning; usually, turning to the unaffected side is allowed; protective devices may be prescribed.
  4. Elevate the head of the bed 30 to 45 degrees for meals only.
  5. Assist the client to ambulate as prescribed by the PHCP.
  6. Avoid weight bearing on the affected leg as prescribed; instruct the client in the use of a walker to avoid weight bearing.
  7. Weight bearing is often restricted after ORIF and may not be restricted after total hip arthroplasty (THA); always refer to the PHCP's prescriptions.
  8. Keep the operative leg extended, supported, and elevated (preventing hip flexion) when getting the client out of bed.
  9. Avoid hip flexion greater than 90 degrees and avoid low chairs when out of bed.
  10. Monitor for wound infection or hemorrhage.
  11. Administer antibiotics if prescribed within a specified time frame (antibiotics also may be prescribed in the preoperative period).
  12. Neurovascular assessment of affected extremity: Check color, pulses, capillary refill, movement, and sensation.
  13. Maintain the compression of the drain if present, to facilitate wound drainage.
  14. Monitor and record drainage amount, which decreases consistently.
  15. As prescribed, carry out postoperative blood salvage to collect, filter, and reinfuse salvaged blood into the client.
  16. Use antiembolism stockings or sequential compression stockings as prescribed; encourage the client to flex and extend the feet to reduce the risk of deep vein thrombosis (DVT).
  17. Instruct the client to avoid crossing the legs and activities that require bending over.
  18. Physical therapy will be instituted postoperatively with progressive ambulation as prescribed by the PHCP.

## X. Total Knee Replacement

A. Description: Total knee replacement is the implantation of a device to substitute for the femoral condyles and tibial joint surfaces.



B. Postoperative interventions

1. Monitor surgical incision for drainage and infection.
2. If prescribed, continuous passive motion (CPM) is started soon after the client is admitted to the postoperative unit.
3. Administer analgesics before CPM to decrease pain.
4. Prepare the client for out-of-bed activities as prescribed; have the client avoid leg dangling.
5. Weight bearing with an assistive device is prescribed as tolerated.
6. Postoperative blood salvage may be prescribed to collect, filter, and reinfuse salvaged blood into the client.
7. Administer antibiotics if prescribed within a specified time frame (antibiotics also may be prescribed in the preoperative period).

#### XI. Joint Dislocation and Subluxation

A. Dislocation: Injury of the ligaments surrounding a joint, which leads to displacement or separating of the articular surfaces of the joint

B. Subluxation: Incomplete displacement of joint surfaces when forces disrupt the soft tissue that surrounds the joints

C. Assessment

1. Asymmetry of the contour of affected body parts
2. Pain, tenderness, dysfunction, and swelling
3. Complications include neurovascular compromise, avascular necrosis, and open joint injuries.
4. X-rays are taken to determine joint shifting.

D. Interventions

1. Focus of treatment includes pain relief, joint support, and joint protection.
2. Immediate treatment is done to reduce the dislocation and realign the dislocated joint.
3. Open or closed reduction is done followed with a postprocedural joint immobilization device.
4. Intravenous conscious sedation, local, or general anesthesia is used during joint manipulation.
5. Initial activity restriction is followed by gentle range-of-motion activities and a gradual return of activities to normal levels while supporting the affected joint.
6. A weakened joint is prone to recurrent dislocation and may require extended activity restriction.

#### XII. Herniation: Intervertebral Disk

A. Description: The nucleus of the disk protrudes into the annulus, causing nerve compression.

B. Cervical disk herniation occurs at the C5 to C6 and C6 to C7 interspaces.

1. Cervical disk herniation causes pain radiation to shoulders, arms, hands, scapulae, and pectoral

muscles.



2. Motor and sensory deficits can include

paresthesia, numbness, and weakness of the upper extremities.



3. Interventions

- a. Conservative management is used unless the client develops signs of neurological deterioration.
- b. Bed rest is prescribed to decrease pressure, inflammation, and pain.
- c. Immobilize the cervical area with a cervical collar or brace.
- d. Apply heat to reduce muscle spasms and apply ice to reduce inflammation and swelling.
- e. Maintain head and spine alignment.
- f. Instruct the client in the use of analgesics, sedatives, antiinflammatory agents, and corticosteroids as prescribed.
- g. Prepare the client for a corticosteroid injection into the epidural space if prescribed.
- h. Assist and instruct the client in the use of a cervical collar or cervical traction as prescribed.

4. Cervical collar is used for cervical disk herniation.

- a. A cervical collar limits neck movement and holds the head in a neutral or slightly flexed position.
- b. The cervical collar may be worn intermittently or 24 hours daily.
- c. Inspect the skin under the collar for irritation.
- d. When prescribed and after pain decreases, exercises are done to strengthen the muscles.



5. Client education related to cervical disk

conditions

- a. Avoid flexing, extending, and rotating the neck.
- b. Avoid the prone position and maintain the neck, spine, and hips in a neutral position while sleeping.

- c. Minimize long periods of sitting.
- d. Instruct the client regarding medications such as analgesics, sedatives, antiinflammatory agents, and corticosteroids.

C. Lumbar disk herniation most often occurs at the L4 to L5 or L5 to S1 interspace.

1. Herniation produces muscle weakness, sensory deficits, and diminished tendon reflexes.



2. The client experiences pain and muscle spasms

in the lower back, with radiation of the pain into 1 hip and down the leg (sciatica).

3. Pain is relieved by bed rest and aggravated by movement, lifting, straining, and coughing.

4. Interventions

- a. Conservative management is indicated unless neurological deterioration or bowel and bladder dysfunction occurs.
- b. Apply heat to decrease muscle spasms and apply ice to decrease inflammation and swelling.
- c. Instruct the client to sleep on the side, with the knees and hips flexed, and place a pillow between the legs.
- d. Apply pelvic traction as prescribed to relieve muscle spasms and decrease pain.
- e. Begin progressive ambulation as inflammation, edema, and pain subside.



5. Client education related to lumbar disk

conditions

- a. Instruct the client in the use of prescribed medications such as analgesics, muscle relaxants, antiinflammatory agents, or corticosteroids.
- b. Instruct the client about application techniques for corsets or braces to maintain immobilization and proper spine alignment.
- c. Instruct the client in correct posture while sitting, standing, walking, and working.
- d. Instruct the client in the correct

technique to use when lifting objects such as bending the knees, maintaining a straight back, and avoiding lifting objects above the elbow level.

- e. Instruct in a weight control program as prescribed.
- f. Instruct the client in an exercise program to strengthen back and abdominal muscles as prescribed.

D. Disk surgery is used when spinal cord compression is suspected or symptoms do not respond to conservative treatment; minimally invasive techniques may be prescribed (Box 60-4).



#### 1. Postoperative interventions: Cervical disk

- a. Monitor for respiratory difficulty from inflammation or hematoma.
- b. Encourage coughing, deep breathing, and early ambulation as prescribed.
- c. Monitor for hoarseness and inability to cough effectively, because this may indicate laryngeal nerve damage.
- d. Use throat sprays or lozenges for sore throat, avoiding anesthetic lozenges that may numb the throat and increase choking risks.
- e. Assess the surgical dressing; monitor the surgical wound for infection, swelling, redness, drainage, or pain; and manage surgical drains accordingly.
- f. Provide a soft diet if the client complains of dysphagia.
- g. Monitor for sudden return of radicular pain, which may indicate cervical spine instability.



#### 2. Postoperative interventions: Lumbar disk

- a. Assess the surgical dressing, monitoring for wound drainage and bleeding and monitoring surgical drains accordingly.
- b. Monitor lower extremities for sensation, movement, color, temperature, and paresthesia.
- c. Monitor for urinary retention, paralytic ileus, and constipation, which can

result from decreased movement, opioid administration, or spinal cord compression.

- d. Prevent constipation by encouraging a high-fiber diet, increased fluid intake, and stool softeners as prescribed.
- e. Administer opioids and sedatives as prescribed to relieve pain and anxiety.
- f. Assist and instruct the client to use a prescribed back brace or corset and to wear cotton underwear to prevent skin irritation.

### 3. Postoperative lumbar disk positioning

- a. In the immediate postoperative period, the client may be expected to lie supine or have other activity restrictions, depending on the specific surgical intervention.
- b. Instruct the client to avoid spinal flexion or twisting and that the spine should be kept aligned.
- c. Instruct the client to minimize sitting, which may place a strain on the surgical site.
- d. When the client is lying supine, place a pillow under the neck and slightly flex the knees.
- e. Avoid extreme hip flexion when lying on the side.



*Following disk surgery, instruct the client in correct logrolling techniques for turning and repositioning and for getting out of bed.*

## XIII. Amputation of a Lower Extremity

### A. Description

1. Amputation ([Fig. 60-5](#)) is the surgical removal of a limb or part of the limb.



2. Complications include hemorrhage, infection, phantom limb sensation and pain, neuroma, and flexion contractures.



### B. Postoperative interventions

- 1. Monitor for signs of complications.
- 2. Mark bleeding and drainage on the dressing if it occurs.

3. Evaluate for phantom limb sensation and pain; explain sensation and pain to the client, and medicate the client as prescribed.
4. To prevent hip flexion contractures, do not elevate the residual limb on a pillow.
5. First 24 hours: Elevate the foot of the bed to reduce edema; then keep the bed flat to prevent hip flexion contractures, if prescribed by the PHCP.
6. After 24 to 48 hours postoperatively, position the client prone to stretch the muscles and prevent hip flexion contractures, if prescribed.
7. Maintain surgical application of dressing, elastic compression wrap, or elastic stump (residual limb) shrinker as prescribed to reduce swelling, minimize pain, and mold the residual limb in preparation for prosthesis (Fig. 60-6)
8. As prescribed, wash the residual limb with mild soap and water and dry completely.
9. Massage the skin toward the suture line if prescribed, to mobilize scar tissue and prevent its adherence to underlying bone.
10. Prepare for the prosthesis and instruct the client in progressive resistive techniques by gently pushing the residual limb against pillows and progressing to firmer surfaces.
11. Encourage verbalization regarding loss of the body part, and assist the client to identify coping mechanisms to deal with the loss.

#### C. Interventions for below-knee amputation

1. Prevent edema.
2. Do not allow the residual limb to hang over the edge of the bed.
3. Discourage long periods of sitting to lessen complications of knee flexion.
4. Place the client in a prone position throughout the day as prescribed by the PHCP.

#### D. Interventions for above-knee amputation

1. Prevent internal or external rotation of the limb.
2. Place a sandbag, rolled towel, or trochanter roll along the outside of the thigh to prevent external rotation.
3. Place the client in a prone position throughout the day as prescribed by the PHCP.

#### E. Rehabilitation

1. Instruct the client in the use of a mobility aid such as crutches or a walker.
2. Prepare the residual limb for a prosthesis.
3. Prepare the client for fitting of the residual limb for a prosthesis.



4. Instruct the client in exercises to maintain range of motion and upper body strengthening.
5. Provide psychosocial support to the client.



#### F. Traumatic amputation: Emergency care

1. Obtain emergency medical assistance (call 911).
2. Stay with the victim, check the amputation site, and apply direct pressure with gauze or cloth (do not remove applied pressure dressing to prevent dislodging of a formed clot).
3. Elevate the extremity above heart level.
4. If finger(s) were amputated, place them in a watertight, sealed plastic bag; place the bag in ice water (not directly on ice); and transport to the emergency department with the victim.



### XIV. Rheumatoid Arthritis

#### A. Description

1. Rheumatoid arthritis is a chronic systemic inflammatory disease (immune complex disorder); the cause may be related to a combination of environmental and genetic factors.
2. Rheumatoid arthritis leads to destruction of connective tissue and synovial membrane within the joints.
3. Rheumatoid arthritis weakens the joint, leading to dislocation and permanent deformity of the joint.
4. Pannus forms at the junction of synovial tissue and articular cartilage and projects into the joint cavity, causing necrosis.
5. Exacerbations of disease manifestations occur during periods of physical or emotional stress and fatigue.
6. Vasculitis can impede blood flow, leading to organ or organ system malfunction and failure caused by tissue ischemia.

#### B. Assessment

1. Inflammation, tenderness, and stiffness of the joints
2. Moderate to severe pain, with morning stiffness lasting longer than 30 minutes
3. Joint deformities, muscle atrophy, and decreased range of motion in affected joints
4. Spongy, soft feeling in the joints
5. Low-grade temperature, fatigue, and weakness
6. Anorexia, weight loss, and anemia
7. Elevated ESR and positive rheumatoid factor
8. Radiographic study showing joint deterioration
9. Synovial tissue biopsy reveals inflammation

C. Rheumatoid factor

1. Blood test used to assist in diagnosing rheumatoid arthritis
2. Reference interval: Negative or less than 60 IU/mL

D. Medications: Combination of pharmacological therapies includes NSAIDs, disease-modifying antirheumatic drugs (DMARDs), and glucocorticoids

E. Physical mobility

1. Preserve joint function.
2. Provide range-of-motion exercises to maintain joint motion and muscle strengthening.
3. Balance rest and activity.
4. Splints may be used during acute inflammation to prevent deformity.
5. Prevent flexion contractures.
6. Apply heat or cold therapy as prescribed to joints.
7. Apply paraffin baths and massage as prescribed.
8. Encourage consistency with exercise program.
9. Use joint-protecting devices.
10. Avoid weight bearing on inflamed joints.

F. Self-care (Box 60-5)

1. Assess the need for assistive devices such as raised toilet seats, self-rising chairs, wheelchairs, and scooters to facilitate mobility.
2. Work with an occupational therapist or PHCP to obtain assistive or adaptive devices.
3. Instruct the client in alternative strategies for providing activities of daily living.

G. Fatigue

1. Identify factors that may contribute to fatigue.
2. Monitor for signs of anemia and administer iron, folic acid, and vitamins as prescribed.
3. Monitor for medication-related blood loss by testing the stool for occult blood.
4. Instruct the client in measures to conserve energy, such as pacing activities and obtaining assistance when possible.

H. Disturbed body image

1. Assess the client's reaction to the body change.
2. Encourage the client to verbalize feelings.
3. Assist the client with self-care activities and grooming.
4. Encourage the client to get dressed daily and to wear street clothes.

I. Surgical interventions

1. Synovectomy: Surgical removal of the synovia to help maintain joint function
2. Arthrodesis: Bony fusion of a joint to regain some mobility

3. Joint replacement (arthroplasty): Surgical replacement of diseased joints with artificial joints; performed to restore motion to a joint and function to the muscles, ligaments, and other soft tissue structures that control a joint



## XV. Osteoarthritis (Degenerative Joint Disease)

### A. Description

1. Osteoarthritis is marked by progressive deterioration of the articular cartilage.
2. Osteoarthritis causes bone buildup and the loss of articular cartilage in peripheral and axial joints.
3. Osteoarthritis affects the weight-bearing joints and joints that receive the greatest stress, such as the hips, knees, lower vertebral column, and hands.
4. The cause of primary osteoarthritis is not known. Risk factors include trauma, aging, obesity, genetic changes, and smoking.

### B. Assessment



1. The client experiences joint pain that diminishes after rest and intensifies after activity, noted early in the disease process.
2. As the disease progresses, pain occurs with slight motion or even at rest.
3. Symptoms are aggravated by temperature change and climate humidity.
4. Presence of Heberden's nodes or Bouchard's nodes (hands)
5. Joint swelling (may be minimal), crepitus, and limited range of motion
6. Difficulty getting up after prolonged sitting
7. Skeletal muscle disuse atrophy
8. Inability to perform activities of daily living
9. Compression of the spine as manifested by radiating pain, stiffness, and muscle spasms in 1 or both extremities

### C. Pain

1. Administer medications as prescribed, such as acetaminophen or topical applications; if acetaminophen or topical agents do not relieve pain, NSAIDs may be prescribed. Muscle relaxants may also be prescribed for muscle spasms, especially those occurring in the back.
2. Prepare the client for corticosteroid injections into joints as prescribed.
3. Position joints in function position and avoid flexion

- of knees and hips.
- 4. Immobilize the affected joint with a splint or brace until inflammation subsides.
- 5. Avoid large pillows under the head or knees.
- 6. Provide a bed or foot cradle to keep linen off of feet and legs until inflammation subsides.
- 7. Instruct the client in the importance of moist heat, hot packs or compresses, and paraffin dips as prescribed.
- 8. Apply cold applications as prescribed when the joint is acutely inflamed.
- 9. Encourage adequate rest.

#### D. Nutrition

- 1. Encourage a well-balanced diet.
- 2. Maintain weight within normal range to decrease stress on the joints.

#### E. Physical mobility

- 1. Instruct the client to balance activity with rest and to participate in an exercise program that limits stressing affected joints.
- 2. Instruct the client that exercises should be active rather than passive and to stop exercise if pain occurs.
- 3. Instruct the client to limit exercise when joint inflammation is severe.

#### F. Surgical management

- 1. Osteotomy: The bone is resected to correct joint deformity, promote realignment, and reduce joint stress.
- 2. Total joint replacement or arthroplasty
  - a. Total joint replacement is performed when all measures of pain relief have failed.
  - b. Hips and knees are replaced most commonly.
  - c. Total joint replacement is contraindicated in the presence of infection, advanced osteoporosis, or severe joint inflammation.



## XVI. Osteoporosis

### A. Description

- 1. Osteoporosis is a metabolic disease characterized by bone demineralization, with loss of calcium and phosphorus salts leading to fragile bones and the subsequent risk for fractures.
- 2. Bone resorption accelerates as bone formation slows.
- 3. Osteoporosis occurs most commonly in the wrist, hip, and vertebral column.
- 4. Osteoporosis can occur postmenopausally or as a

- result of a metabolic disorder or calcium deficiency.
5. The client may be asymptomatic until the bones become fragile and a minor injury or movement causes a fracture.
  6. Primary osteoporosis
    - a. Most often occurs in postmenopausal women; occurs in men with low testosterone levels
    - b. Risk factors include decreased calcium intake, deficient estrogen, and sedentary lifestyle.
  7. Secondary osteoporosis
    - a. Causes include prolonged therapy with corticosteroids, thyroid-reducing medications, aluminum-containing antacids, or antiseizure medications.
    - b. Associated with immobility, alcoholism, malnutrition, or malabsorption

#### B. Assessment

1. Risk factors (Box 60-6)
2. Possibly asymptomatic
3. Back pain that occurs after lifting, bending, or stooping
4. Back pain that increases with palpation
5. Pelvic or hip pain, especially with weight bearing
6. Problems with balance
7. Decline in height from vertebral compression
8. Kyphosis of the dorsal spine, also known as “dowager’s hump”
9. Degeneration of lower thorax and lumbar vertebrae on radiographic studies



*The client with osteoporosis is at risk for pathological fractures.*



#### C. Interventions

1. Assess risk for and prevent injury in the client’s personal environment.
  - a. Assist the client to identify and correct hazards in his or her environment.
  - b. Position household items and furniture to ensure an unobstructed walkway.
  - c. Use side rails to prevent falls.
  - d. Instruct in use of assistive devices such as a cane or walker.
  - e. Encourage the use of a firm mattress.

2. Provide personal care to the client to reduce injuries.
  - a. Move the client gently when turning and repositioning.
  - b. Assist with ambulation if the client is unsteady.
  - c. Provide gentle range-of-motion exercises.
  - d. Apply a back brace as prescribed during an acute phase to immobilize the spine and provide spinal column support.
3. Provide the client with instructions to promote optimal level of health and function.
  - a. Instruct the client in the use of correct body mechanics.
  - b. Instruct the client in exercises to strengthen abdominal and back muscles to improve posture and provide support for the spine.
  - c. Instruct the client to avoid activities that can cause vertebral compression.
  - d. Instruct the client to eat a diet high in protein, calcium, vitamins C and D, and iron.
  - e. Instruct the client to avoid alcohol and coffee.
  - f. Instruct the client to maintain an adequate fluid intake to prevent renal calculi.
4. Administer medications as prescribed to promote bone strength and decrease pain.

## XVII. Gout

### A. Description

1. Gout is a systemic disease in which urate crystals deposit in joints and other body tissues.
2. Gout results from abnormal amounts of uric acid in the body.
3. Primary gout results from a disorder of purine metabolism.
4. Secondary gout involves excessive uric acid in the blood, caused by another disease.

### B. Phases

1. Asymptomatic: Client has no symptoms, but serum uric acid level is elevated.
2. Acute: Client has excruciating pain and inflammation of 1 or more small joints, especially the great toe.
3. Intermittent: Client has intermittent periods without symptoms between acute attacks.

4. Chronic: Results from repeated episodes of acute gout
  - a. Results in deposits of urate crystals under the skin
  - b. Results in deposits of urate crystals within major organs, such as the kidneys, leading to organ dysfunction

C. Assessment



1. Swelling and inflammation of the joints, leading to excruciating pain
2. Tophi: Hard, irregularly shaped nodules in the skin containing chalky deposits of sodium urate
3. Low-grade fever, malaise, and headache
4. Pruritus from urate crystals in the skin
5. Presence of renal stones from elevated uric acid levels

D. Interventions

1. Provide a low-purine diet as prescribed, avoiding foods such as organ meats, wines, and aged cheese.
2. Encourage a high fluid intake of 2000 mL/day to prevent stone formation.
3. Encourage a weight reduction diet if required.
4. Instruct the client to avoid alcohol and starvation diets, because they may precipitate a gout attack.
5. Increase urinary pH (above 6) by eating alkaline ash foods (i.e., green beans, broccoli).
6. Provide bed rest during acute attacks, with the affected extremity elevated.
7. Monitor joint range-of-motion ability and appearance of joints.
8. Position the joint in mild flexion during acute attack.
9. Protect the affected joint from excessive movement or direct contact with sheets or blankets.
10. Provide heat or cold for local treatments to affected joint as prescribed.
11. Administer medications such as analgesic, antiinflammatory, and uricosuric agents as prescribed.

**Table 60-1**

**Types of Joints**

Type	Description
Amphiarthrosis	Cartilaginous joint Slightly movable
Diarthrosis	Synovial joint Ball-and-socket joint Permit free movement
Synarthrosis	Fibrous or fixed joint

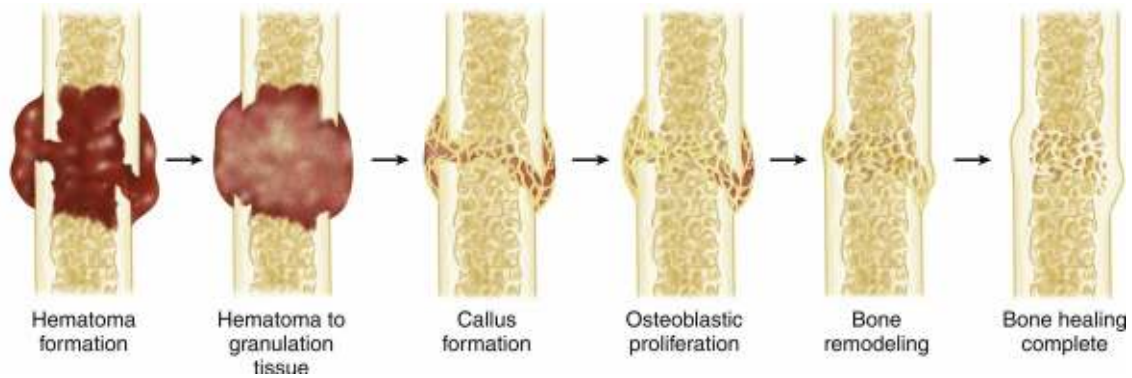


FIG. 60-1 The stages of bone healing.

### Box 60-1

## Risk Factors Associated with Musculoskeletal Problems

- Autoimmune disorders
- Calcium deficiency
- Falls
- Hyperuricemia
- Infection
- Medications
- Metabolic disorders
- Neoplastic disorders
- Obesity
- Postmenopausal states
- Trauma and injury

### Box 60-2

## Types of Fractures

**Closed or Simple:** Skin over the fractured area remains intact.

**Comminuted:** The bone is splintered or crushed, creating numerous fragments.

**Complete:** The bone is separated completely by a break into 2 parts.

**Compression:** A fractured bone is compressed by other bone.

**Depressed:** Bone fragments are driven inward.

**Greenstick:** One side of the bone is broken and the other is bent; these fractures



occur most commonly in children.

**Impacted:** A part of the fractured bone is driven into another bone.

**Incomplete:** Fracture line does not extend through the full transverse width of the bone.

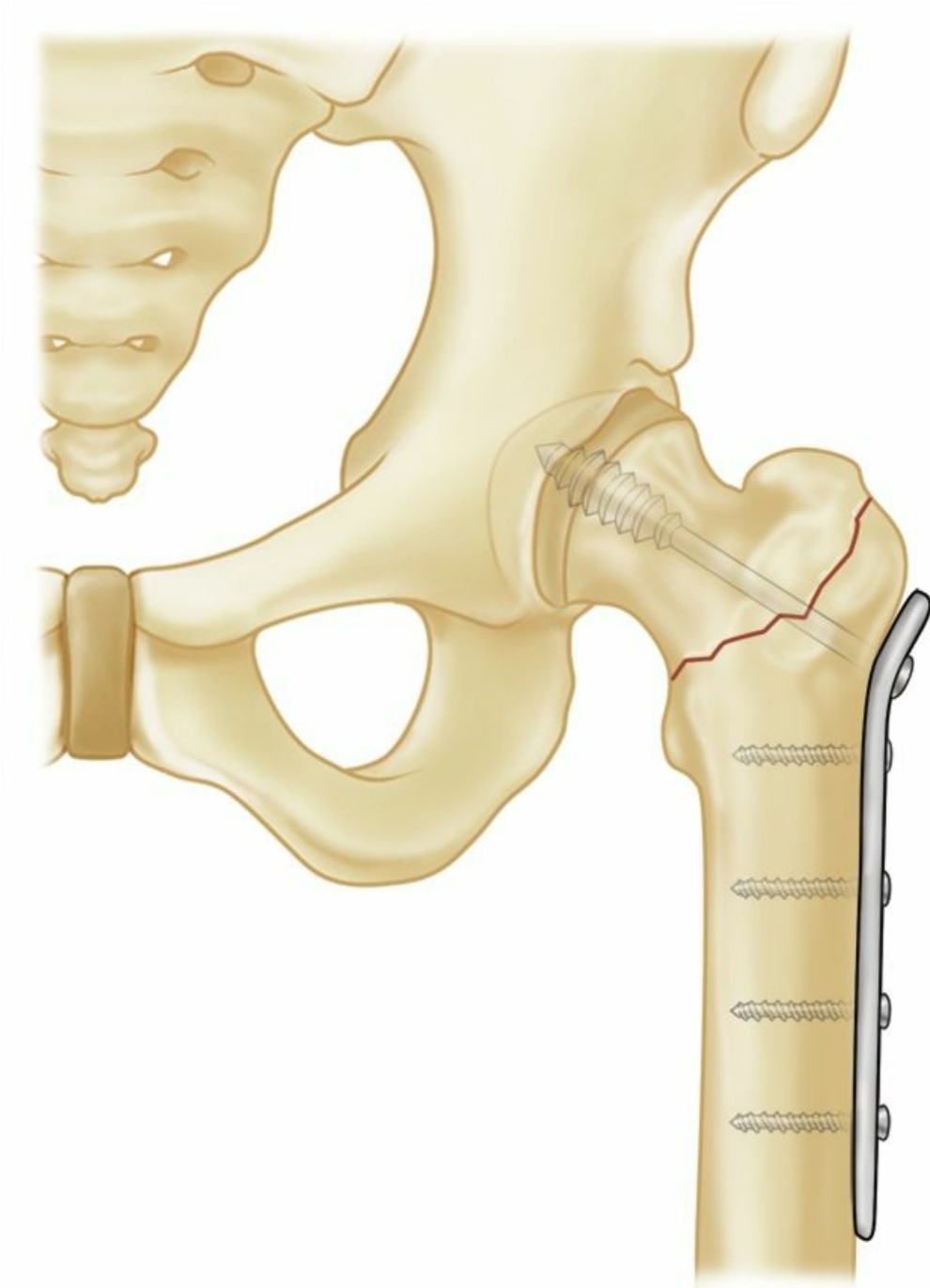
**Oblique:** The fracture line runs at an angle across the axis of the bone.

**Open or Compound:** The bone is exposed to air through a break in the skin, and soft tissue injury and infection are common.

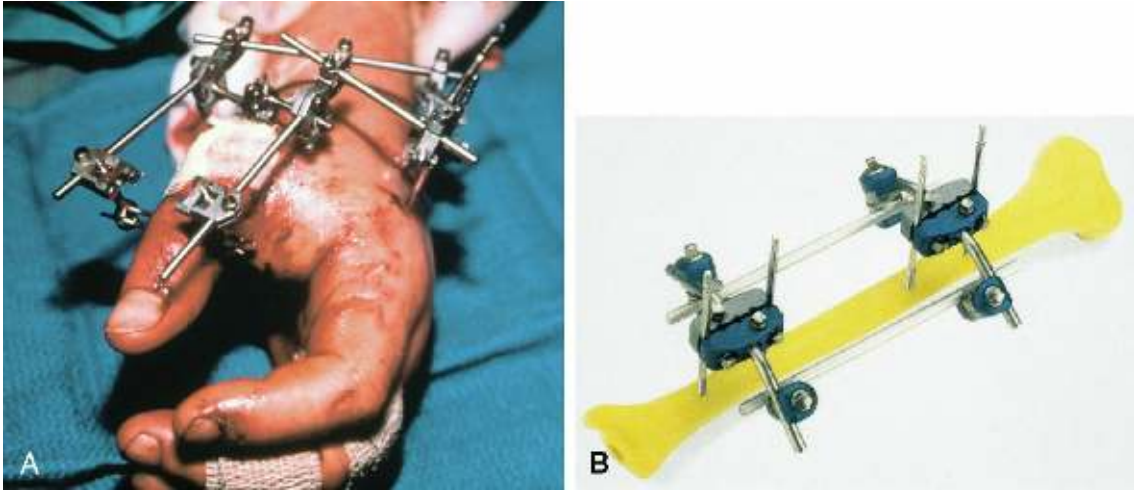
**Pathological:** The fracture results from weakening of the bone structure by pathological processes such as neoplasia; also called *spontaneous fracture*.

**Spiral:** The break partially encircles bone.

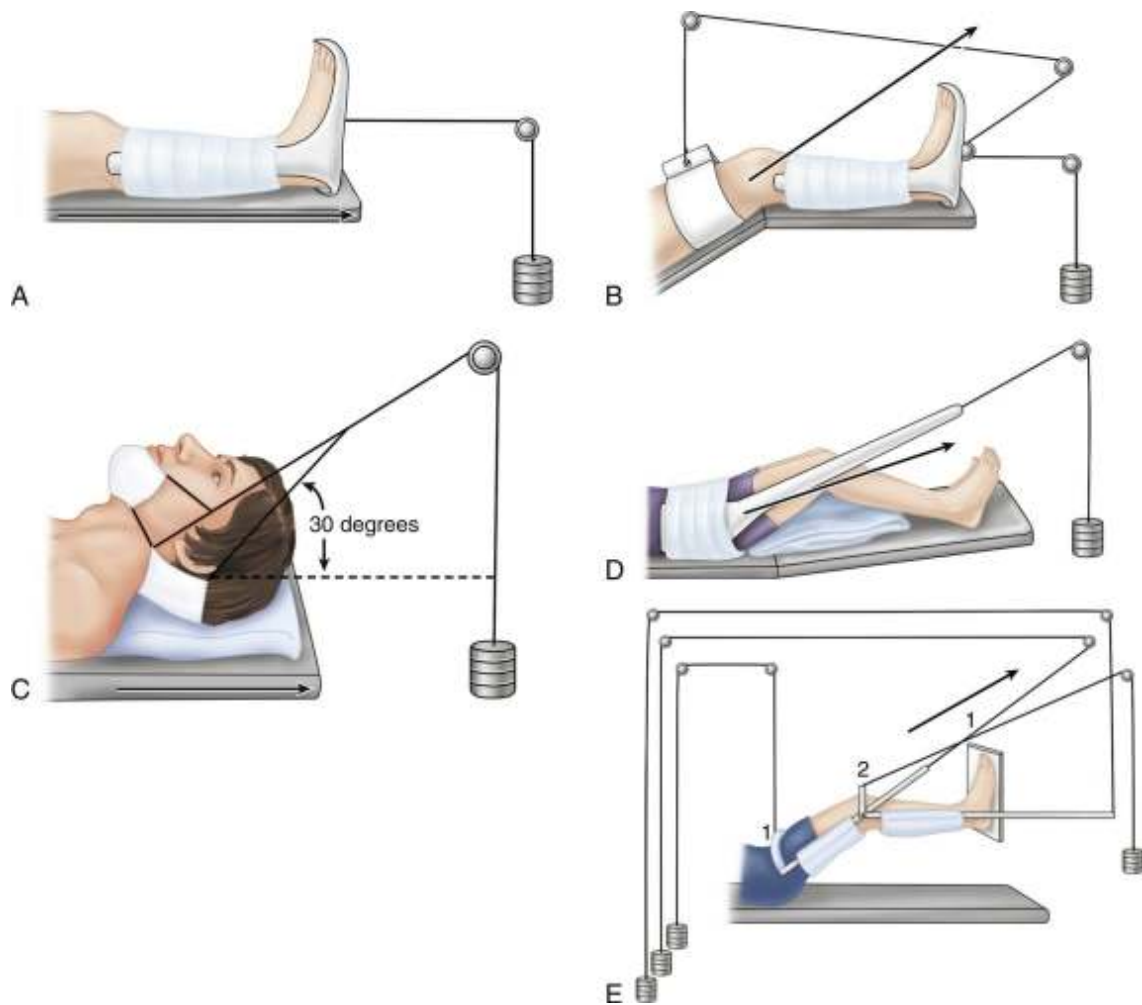
**Transverse:** The bone is fractured straight across.



**FIG. 60-2** A compression hip screw used for open reduction with internal fixation.



**FIG. 60-3** External fixators. **A**, Mini-Hoffman system in use on hand. **B**, Hoffman II on the tibia (standard system). (From Lewis et al., 2011.)



**FIG. 60-4** Types of traction. **A**, Buck's traction. **B**, Russell's traction. **C**, Head halter traction. **D**, Pelvic traction. **E**, Balanced suspension traction.

### Box 60-3

## Complications of Fractures

- Avascular necrosis
- Compartment syndrome
- Fat embolism
- Infection and osteomyelitis
- Pulmonary embolism

### Table 60-2

#### Crutch Gaits

Type of Gait	Use	Procedure

Two-point gait	Used with partial weight-bearing limitations and with bilateral lower extremity prostheses	The crutch on the affected side and the unaffected foot are advanced at the same time
Three-point gait	Used for partial weight bearing or no weight bearing on the affected leg; requires that the client have strength and balance	Both crutches and the foot of the affected extremity are advanced together, followed by the foot of the unaffected extremity
Four-point gait	Used if weight bearing is allowed and 1 foot can be placed in front of the other	The right crutch is advanced, then the left foot, then the left crutch, and then the right foot
Swing-to gait	Used when there is adequate muscle power and balance in the arms and legs	Both crutches are advanced together, then both legs are lifted and placed down on a spot behind the crutches. The feet and crutches form a tripod.
Swing-through gait	Used when there is adequate muscle power and balance in the arms and legs	Both crutches are advanced together; then both legs are lifted through and beyond the crutches and placed down again at a point in front of the crutches

Adapted from Linton AD: *Introduction to medical-surgical nursing*, ed 4, St. Louis, 2007, Saunders.

#### **Box 60-4**

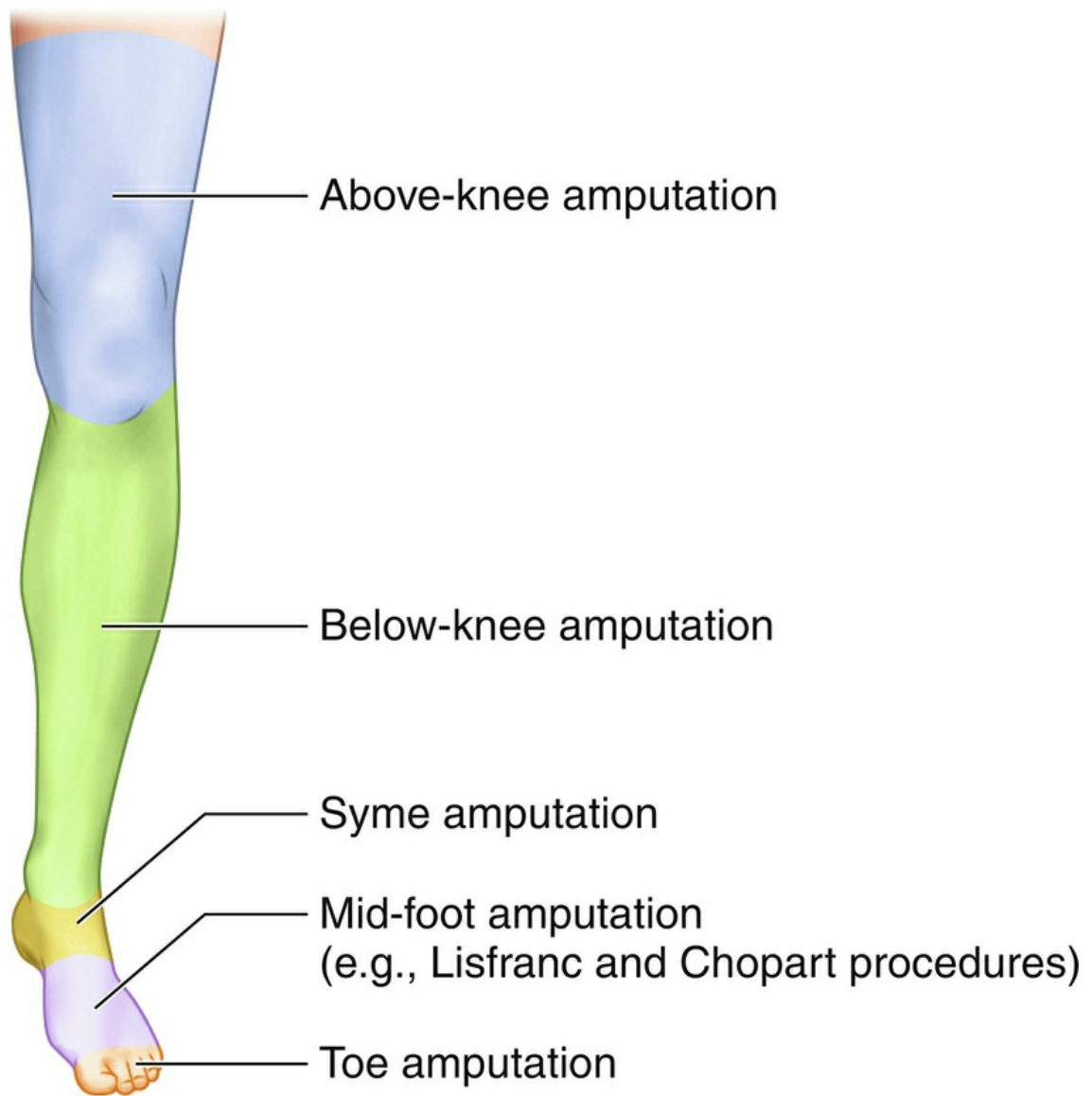
### **Types of Disk Surgery**

***Diskectomy:*** Removal of herniated disk tissue and related matter

***Diskectomy with Fusion:*** Fusion of vertebrae with bone graft

***Laminectomy:*** Excision of part of the vertebrae (lamina) to remove the disk

***Laminotomy:*** Division of the lamina of a vertebra



**FIG. 60-5** Common levels of lower extremity amputation.



**FIG. 60-6** A common method of wrapping a residual limb. *Left*, Wrapping for above-knee amputation. *Right*, Wrapping for below-knee amputation.

### **Box 60-5**

## **Client Education for Rheumatoid Arthritis and Degenerative Joint Disease**

- Assist the client to identify and correct safety hazards in the home.
- Instruct the client in the correct use of assistive or adaptive devices.
- Instruct the client in energy conservation measures.
- Review the prescribed exercise program.
- Instruct the client to sit in a chair with a high, straight back.
- Instruct the client to use only a small pillow when lying down.
- Instruct the client in measures to protect the joints.
- Instruct the client regarding the prescribed medications.
- Stress the importance of follow-up visits with the primary health care provider.

### **Box 60-6**

## **Risk Factors for Osteoporosis**

- Cigarette smoking
- Early menopause
- Excessive use of alcohol
- Family history
- Female gender
- Increasing age
- Insufficient intake of calcium
- Sedentary lifestyle
- Thin, small frame
- White (European descent) or Asian race

## **Practice Questions**

735. The nurse is conducting health screening for osteoporosis. Which client is at greatest risk of developing this problem?
1. A 25-year-old woman who runs
  2. A 36-year-old man who has asthma
  3. A 70-year-old man who consumes excess alcohol
  4. A sedentary 65-year-old woman who smokes cigarettes
736. The nurse has given instructions to a client returning home after knee arthroscopy. Which statement by the client indicates that the instructions are understood?
1. "I can resume regular exercise tomorrow."

2. "I can't eat food for the remainder of the day."
  3. "I need to stay off the leg entirely for the rest of the day."
  4. "I need to report a fever or swelling to my health care provider."
737. The nurse witnessed a vehicle hit a pedestrian. The victim is dazed and tries to get up. A leg appears fractured. Which intervention should the nurse take?
1. Try to reduce the fracture manually.
  2. Assist the victim to get up and walk to the sidewalk.
  3. Leave the victim for a few moments to call an ambulance.
  4. Stay with the victim and encourage him or her to remain still.
738. Which cast care instructions should the nurse provide to a client who just had a plaster cast applied to the right forearm? **Select all that apply.**
1. Keep the cast clean and dry.
  2. Allow the cast 24 to 72 hours to dry.
  3. Keep the cast and extremity elevated.
  4. Expect tingling and numbness in the extremity.
  5. Use a hair dryer set on a warm to hot setting to dry the cast.
  6. Use a soft, padded object that will fit under the cast to scratch the skin under the cast.
739. The nurse is evaluating a client in skeletal traction. When evaluating the pin sites, the nurse would be **most** concerned with which finding?
1. Redness around the pin sites
  2. Pain on palpation at the pin sites
  3. Thick, yellow drainage from the pin sites
  4. Clear, watery drainage from the pin sites
740. The nurse is assessing the casted extremity of a client. Which sign is indicative of infection?
1. Dependent edema
  2. Diminished distal pulse
  3. Presence of a "hot spot" on the cast
  4. Coolness and pallor of the extremity
741. A client has sustained a closed fracture and has just had a cast applied to the affected arm. The client is complaining of intense pain. The nurse elevates the limb, applies an ice bag, and administers an analgesic, with little relief. Which problem may be causing this pain?
1. Infection under the cast
  2. The anxiety of the client
  3. Impaired tissue perfusion
  4. The recent occurrence of the fracture
742. The nurse is admitting a client with multiple trauma injuries to the nursing unit. The client has a leg fracture and had a plaster cast applied. Which position would be **best** for the casted leg?
1. Elevated for 3 hours, then flat for 1 hour
  2. Flat for 3 hours, then elevated for 1 hour
  3. Flat for 12 hours, then elevated for 12 hours



4. Elevated on pillows continuously for 24 to 48 hours
743. A client is being discharged to home after application of a plaster leg cast. Which statement indicates that the client understands proper care of the cast?
1. "I need to avoid getting the cast wet."
  2. "I need to cover the casted leg with warm blankets."
  3. "I need to use my fingertips to lift and move my leg."
  4. "I need to use something like a padded coat hanger end to scratch under the cast if it itches."
744. A client being measured for crutches asks the nurse why the crutches cannot rest up underneath the arm for extra support. The nurse responds knowing that which would **most likely** result from this improper crutch measurement?
1. A fall and further injury
  2. Injury to the brachial plexus nerves
  3. Skin breakdown in the area of the axilla
  4. Impaired range of motion while the client ambulates
745. The nurse has given the client instructions about crutch safety. Which statements indicate that the client understands the instructions? **Select all that apply.**
1. "I should not use someone else's crutches."
  2. "I need to remove any scatter rugs at home."
  3. "I can use crutch tips even when they are wet."
  4. "I need to have spare crutches and tips available."
  5. "When I'm using the crutches, my arms need to be completely straight."
746. The nurse is caring for a client being treated for fat embolus after multiple fractures. Which data would the nurse evaluate as the **most** favorable indication of resolution of the fat embolus?
1. Clear mentation
  2. Minimal dyspnea
  3. Oxygen saturation of 85%
  4. Arterial oxygen level of 78 mm Hg
747. The nurse has conducted teaching with a client in an arm cast about the signs and symptoms of compartment syndrome. The nurse determines that the client understands the information if the client states that he or she should report which **early** symptom of compartment syndrome?
1. Cold, bluish-colored fingers
  2. Numbness and tingling in the fingers
  3. Pain that increases when the arm is dependent
  4. Pain that is out of proportion to the severity of the fracture
748. A client with diabetes mellitus has had a right below-knee amputation. Given the client's history of diabetes mellitus, which complication is the client at **most** risk for after surgery?
1. Hemorrhage

2. Edema of the residual limb
  3. Slight redness of the incision
  4. Separation of the wound edges
749. The nurse is caring for a client who had an above-knee amputation 2 days ago. The residual limb was wrapped with an elastic compression bandage, which has come off. Which **immediate** action should the nurse take?
1. Apply ice to the site.
  2. Call the primary health care provider (PHCP).
  3. Rewrap the residual limb with an elastic compression bandage.
  4. Apply a dry, sterile dressing and elevate the residual limb on 1 pillow.
750. A client is complaining of low back pain that radiates down the left posterior thigh. The nurse should ask the client if the pain is worsened or aggravated by which factor?
1. Bed rest
  2. Ibuprofen
  3. Bending or lifting
  4. Application of heat
751. The nurse is caring for a client who has had spinal fusion, with insertion of hardware. The nurse would be **most** concerned with which assessment finding?
1. Temperature of 101.6° F (38.7° C) orally
  2. Complaints of discomfort during repositioning
  3. Old bloody drainage outlined on the surgical dressing
  4. Discomfort during coughing and deep-breathing exercises
752. The nurse is caring for a client with a diagnosis of gout. Which laboratory value would the nurse expect to note in the client?
1. Calcium level of 9.0 mg/dL (2.25 mmol/L)
  2. Uric acid level of 9.0 mg/dL (540 mcmol/L)
  3. Potassium level of 4.1 mEq/L (4.1 mmol/L)
  4. Phosphorus level of 3.1 mg/dL (1.0 mmol/L)
753. A client with a hip fracture asks the nurse about Buck's (extension) traction that is being applied before surgery and what is involved. The nurse should provide which information to the client?
1. Allows bony healing to begin before surgery and involves pins and screws
  2. Provides rigid immobilization of the fracture site and involves pulleys and wheels
  3. Lengthens the fractured leg to prevent severing of blood vessels and involves pins and screws
  4. Provides comfort by reducing muscle spasms, provides fracture immobilization, and involves pulleys and wheels

## Answers

735. *Answer:* 4

**Rationale:** Risk factors for osteoporosis include female gender, being postmenopausal, advanced age, a low-calcium diet, excessive alcohol intake, being sedentary, and smoking cigarettes. Long-term use of corticosteroids, anticonvulsants, and/or furosemide also increases the risk.

**Test-Taking Strategy:** Focus on the **subject**, risk factors for osteoporosis. The 25-year-old woman who runs (exercises using the long bones) has negligible risk. The 36-year-old man with asthma is eliminated next because his only risk factor might be long-term corticosteroid use (if prescribed) to treat the asthma. Of the remaining options, the 65-year-old woman has higher risk (age, gender, postmenopausal, sedentary, smoking) than the 70-year-old man (age, alcohol consumption).

**Level of Cognitive Ability:** Analyzing

**Client Needs:** Health Promotion and Maintenance

**Integrated Process:** Nursing Process—Assessment

**Content Area:** Adult Health: Musculoskeletal

**Health Problem:** Adult Health: Musculoskeletal: Osteoporosis

**Priority Concepts:** Health Promotion; Mobility

**Reference:** Ignatavicius, Workman, Rebar (2018), p. 1017.

736. *Answer:* 4

**Rationale:** After arthroscopy, the client usually can walk carefully on the leg once sensation has returned. The client is instructed to avoid strenuous exercise for the length of time prescribed by the surgeon. The client may resume the usual diet. Signs and symptoms of infection should be reported to the primary health care provider.

**Test-Taking Strategy:** Focus on the **subject**, teaching points following knee arthroscopy. Recalling the general client teaching points related to surgical procedures and that a risk for infection exists after a surgical procedure will direct you to the correct option.

**Level of Cognitive Ability:** Evaluating

**Client Needs:** Physiological Integrity

**Integrated Process:** Nursing Process—Evaluation

**Content Area:** Adult Health: Musculoskeletal

**Health Problem:** N/A

**Priority Concepts:** Client Education; Safety

**Reference:** Ignatavicius, Workman, Rebar (2018), p. 1014.

737. *Answer:* 4

**Rationale:** With a suspected fracture, the victim is not moved unless it is dangerous to remain in that spot. The nurse should remain with the victim and have someone else call for emergency help. A fracture is not reduced at the scene. Before the victim is moved, the site of fracture is immobilized to prevent further injury.

**Test-Taking Strategy:** Eliminate options 1 and 2 first because they are **comparable or alike** in that either of these options could result in further injury to the victim. Of the remaining options, the more prudent action would be for the nurse to remain with the victim and have someone else call for emergency assistance.

**Level of Cognitive Ability:** Applying

**Client Needs:** Physiological Integrity  
**Integrated Process:** Nursing Process—Implementation  
**Content Area:** Adult Health: Musculoskeletal  
**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury  
**Priority Concepts:** Clinical Judgment; Safety  
**Reference:** Ignatavicius, Workman, Rebar (2018), pp. 1037-1038.

738. *Answer:* 1, 2, 3

**Rationale:** A plaster cast takes 24 to 72 hours to dry (synthetic casts dry in 20 minutes). The cast and extremity should be elevated to reduce edema if prescribed. A wet cast is handled with the palms of the hand until it is dry, and the extremity is turned (unless contraindicated) so that all sides of the wet cast will dry. A cool setting on the hair dryer can be used to dry a plaster cast (heat cannot be used on a plaster cast because the cast heats up and burns the skin). The cast needs to be kept clean and dry, and the client is instructed not to stick anything under the cast because of the risk of breaking skin integrity. The client is instructed to monitor the extremity for circulatory impairment, such as pain, swelling, discoloration, tingling, numbness, coolness, or diminished pulse. The primary health care provider is notified immediately if circulatory impairment occurs.

**Test-Taking Strategy:** Focus on the **subject**, a plaster cast. Recalling that edema occurs following a fracture and recalling the complications associated with a cast will assist you in answering the question.

**Level of Cognitive Ability:** Analyzing  
**Client Needs:** Physiological Integrity  
**Integrated Process:** Teaching and Learning  
**Content Area:** Adult Health: Musculoskeletal  
**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury  
**Priority Concepts:** Client Education; Safety  
**Reference:** Lewis et al. (2017), pp. 1471-1472.

739. *Answer:* 3

**Rationale:** The nurse should monitor for signs of infection such as inflammation, purulent (thick white or yellow) drainage, and pain at the pin site. However, some degree of inflammation, pain at the pin site, and serous drainage would be expected; the nurse should correlate assessment findings with other clinical findings, such as fever, elevated white blood cell count, and changes in vital signs. Additionally, the nurse should compare any findings to baseline findings to determine if there were any changes.

**Test-Taking Strategy:** Note the **strategic word**, *most*. **Determine if an abnormality exists.** Recall that purulent drainage is indicative of infection, and that some degree of pain, inflammation, and serous drainage should be expected.

**Level of Cognitive Ability:** Evaluating  
**Client Needs:** Physiological Integrity  
**Integrated Process:** Nursing Process—Evaluation  
**Content Area:** Adult Health: Musculoskeletal

**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury  
**Priority Concepts:** Clinical Judgment; Tissue Integrity  
**Reference:** Ignatavicius, Workman, Rebar (2018), pp. 1040-1041.

740. *Answer:* 3

**Rationale:** Signs of infection under a casted area include odor or purulent drainage from the cast or the presence of “hot spots,” which are areas of the cast that are warmer than others. The primary health care provider should be notified if any of these occur. Signs of impaired circulation in the distal limb include coolness and pallor of the skin, diminished distal pulse, and edema.

**Test-Taking Strategy:** Focus on the **subject**, signs of infection. Think about what you would expect to note with infection—redness, swelling, heat, and purulent drainage. With this in mind, you can eliminate options 2 and 4 easily. From the remaining options, remember that “dependent edema” is not necessarily indicative of infection. Swelling would be continuous. The hot spot on the cast could signify infection underneath that area.

**Level of Cognitive Ability:** Analyzing

**Client Needs:** Physiological Integrity

**Integrated Process:** Nursing Process—Assessment

**Content Area:** Adult Health: Musculoskeletal

**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury

**Priority Concepts:** Infection; Tissue Integrity

**Reference:** Ignatavicius, Workman, Rebar (2018), p. 1039.

741. *Answer:* 3

**Rationale:** Most pain associated with fractures can be minimized with rest, elevation, application of cold, and administration of analgesics. Pain that is not relieved by these measures should be reported to the primary health care provider because pain unrelieved by medications and other measures may indicate neurovascular compromise. Because this is a new closed fracture and cast, infection would not have had time to set in. Intense pain after casting is normally not associated with anxiety or the recent occurrence of the injury. Treatment following the fracture should assist in relieving the pain associated with the injury.

**Test-Taking Strategy:** Focus on the **subject**, intense pain, and focus on the **data in the question**. Use of the **ABCs—airway, breathing, and circulation**—will direct you to the correct option.

**Level of Cognitive Ability:** Analyzing

**Client Needs:** Physiological Integrity

**Integrated Process:** Nursing Process—Assessment

**Content Area:** Adult Health: Musculoskeletal

**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury

**Priority Concepts:** Pain; Tissue Integrity

**Reference:** Ignatavicius, Workman, Rebar (2018), p. 1039.

742. *Answer:* 4

**Rationale:** A casted extremity is elevated continuously for the first 24 to 48 hours to minimize swelling and promote venous drainage. Options 1, 2, and 3 are incorrect.

**Test-Taking Strategy:** Note the **strategic word**, *best*. Recalling that edema is a concern following an injury and knowledge of the effects of gravity on edema will direct you to the correct option.

**Level of Cognitive Ability:** Applying

**Client Needs:** Physiological Integrity

**Integrated Process:** Nursing Process—Implementation

**Content Area:** Adult Health: Musculoskeletal

**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury

**Priority Concepts:** Perfusion; Tissue Integrity

**Reference:** Ignatavicius, Workman, Rebar (2018), p. 1039.

743. **Answer:** 1

**Rationale:** A plaster cast must remain dry to keep its strength. The cast should be handled with the palms of the hands, not the fingertips, until fully dry; using the fingertips results in indentations in the cast and skin pressure under the cast. Air should circulate freely around the cast to help it dry; the cast also gives off heat as it dries. The client should never scratch under the cast because of the risk of altered skin integrity; the client may use a hair dryer on the cool setting to relieve an itch.

**Test-Taking Strategy:** Focus on the **subject**, client understanding about cast care. Knowing that a wet cast can be dented with the fingertips, causing pressure underneath, helps eliminate option 3 first. Knowing that the cast needs to dry helps eliminate option 2 next. Option 4 is dangerous to skin integrity and is also eliminated. Remember that plaster casts, once they have dried after application, should not become wet.

**Level of Cognitive Ability:** Evaluating

**Client Needs:** Physiological Integrity

**Integrated Process:** Nursing Process—Evaluation

**Content Area:** Adult Health: Musculoskeletal

**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury

**Priority Concepts:** Client Education; Safety

**Reference:** Ignatavicius, Workman, Rebar (2018), p. 1039.

744. **Answer:** 2

**Rationale:** Crutches are measured so that the tops are 2 to 3 fingerwidths from the axillae. This ensures that the client's axillae are not resting on the crutch or bearing the weight of the crutch, which could result in injury to the nerves of the brachial plexus. Although the conditions in options 1, 3, and 4 can occur, they are not the most likely result from resting the axilla directly on the crutches.

**Test-Taking Strategy:** Note the **strategic words**, *most likely*, and focus on the **data in the question**. Recalling the risk associated with brachial nerve plexus injury will direct you to the correct option.

**Level of Cognitive Ability:** Applying

**Client Needs:** Physiological Integrity  
**Integrated Process:** Teaching and Learning  
**Content Area:** Adult Health: Musculoskeletal  
**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury  
**Priority Concepts:** Client Education; Safety  
**Reference:** Potter et al. (2017), pp. 806-807.

745. **Answer:** 1, 2, 4

**Rationale:** The client should use only crutches measured for the client. When assessing for home safety, the nurse ensures that the client knows to remove any scatter rugs and does not walk on highly waxed floors. The tips should be inspected for wear, and spare crutches and tips should be available if needed. Crutch tips should remain dry. If crutch tips get wet, the client should dry them with a cloth or paper towel. When walking with crutches, both elbows need to be flexed not more than 30 degrees when the palms are on the handle.

**Test-Taking Strategy:** Focus on the **subject**, client understanding of instructions of using crutches. Visualize each option and think about the safety associated with each instruction. This will assist in answering correctly.

**Level of Cognitive Ability:** Evaluating  
**Client Needs:** Safe and Effective Care Environment  
**Integrated Process:** Nursing Process—Evaluation  
**Content Area:** Adult Health: Musculoskeletal  
**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury  
**Priority Concepts:** Mobility; Safety  
**Reference:** Potter et al. (2017), pp. 806-807.

746. **Answer:** 1

**Rationale:** An altered mental state is an early indication of fat emboli; therefore, clear mentation is a good indicator that a fat embolus is resolving. Eupnea, not minimal dyspnea, is a normal sign. Arterial oxygen levels should be 80 to 100 mm Hg. Oxygen saturation should be higher than 95%.

**Test-Taking Strategy:** Note the **strategic word**, *most*. Knowing that the arterial oxygen and oxygen saturation levels are below normal helps eliminate options 3 and 4. Dyspnea, even at a minimal level, is not normal, so eliminate option 2.

**Level of Cognitive Ability:** Evaluating  
**Client Needs:** Physiological Integrity  
**Integrated Process:** Nursing Process—Evaluation  
**Content Area:** Adult Health: Musculoskeletal  
**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury  
**Priority Concepts:** Evidence; Perfusion  
**Reference:** Lewis et al. (2017), p. 1480.

747. **Answer:** 2

**Rationale:** The earliest symptom of compartment syndrome is paresthesia

(numbness and tingling in the fingers). Other symptoms include pain unrelieved by opioids, pain that increases with limb elevation, and pallor and coolness to the distal limb. Cyanosis is a late sign. Pain that is out of proportion to the severity of the fracture, along with other symptoms associated with the pain, is not an early manifestation.

**Test-Taking Strategy:** Note the **strategic word**, *early*. Knowing that compartment syndrome is characterized by insufficient circulation and ischemia caused by pressure will direct you to the correct option.

**Level of Cognitive Ability:** Evaluating

**Client Needs:** Physiological Integrity

**Integrated Process:** Nursing Process—Evaluation

**Content Area:** Adult Health: Musculoskeletal

**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury

**Priority Concepts:** Client Education; Perfusion

**Reference:** Lewis et al. (2017), p. 1479.

748. **Answer:** 4

**Rationale:** Clients with diabetes mellitus are more prone to wound infection, wound separation, and delayed wound healing because of the disease. Postoperative hemorrhage and edema of the residual limb are complications in the immediate postoperative period that apply to any client with an amputation. Slight redness of the incision is considered normal, as long as the incision is dry and intact.

**Test-Taking Strategy:** Note the **strategic word**, *most*, and focus on the **subject**, complications following surgery for the client with diabetes mellitus. Recalling that diabetes mellitus increases the client's chances of developing infection and delayed wound healing will direct you to the correct option.

**Level of Cognitive Ability:** Analyzing

**Client Needs:** Physiological Integrity

**Integrated Process:** Nursing Process—Assessment

**Content Area:** Adult Health: Musculoskeletal

**Health Problem:** Adult Health: Musculoskeletal: Amputation

**Priority Concepts:** Glucose Regulation; Tissue Integrity

**Reference:** Lewis et al. (2017), p. 1487.

749. **Answer:** 3

**Rationale:** If the client with an amputation has a cast or elastic compression bandage that slips off, the nurse must wrap the residual limb immediately with another elastic compression bandage. Otherwise, excessive edema will form rapidly, which could cause a significant delay in rehabilitation. If the client had a cast that slipped off, the nurse would have to call the PHCP so that a new one could be applied. Elevation on 1 pillow is not going to impede the development of edema greatly once compression is released. Ice would be of limited value in controlling edema from this cause. If the PHCP were called, the prescription likely would be to reapply the compression dressing anyway.

**Test-Taking Strategy:** Note the **strategic word**, *immediate*, and focus on the **data in**



**the question.** Recalling that excessive edema can form rapidly in the residual limb will direct you to the correct option.

**Level of Cognitive Ability:** Analyzing

**Client Needs:** Physiological Integrity

**Integrated Process:** Nursing Process—Implementation

**Content Area:** Adult Health: Musculoskeletal

**Health Problem:** Adult Health: Musculoskeletal: Amputation

**Priority Concepts:** Clinical Judgment; Tissue Integrity

**Reference:** Lewis et al. (2017), p. 1487.

750. *Answer:* 3

**Rationale:** Low back pain that radiates down 1 leg (sciatica) is consistent with herniated lumbar disk. The nurse assesses the client to see whether the pain is aggravated by events that increase intraspinal pressure, such as bending, lifting, sneezing, and coughing, or by lifting the leg straight up while supine (straight leg-raising test). Bed rest, heat (or sometimes ice), and nonsteroidal antiinflammatory drugs (NSAIDs) usually relieve back pain.

**Test-Taking Strategy:** Focus on the **subject**, factors that aggravate back pain. Think about how each item in the options would relieve or exacerbate back pain. Recall that bed rest, heat (or sometimes ice), and NSAIDs usually relieve back pain, whereas bending, lifting, and straining aggravate it.

**Level of Cognitive Ability:** Analyzing

**Client Needs:** Physiological Integrity

**Integrated Process:** Nursing Process—Assessment

**Content Area:** Adult Health: Musculoskeletal

**Health Problem:** Adult Health: Musculoskeletal: Intervertebral Disc Herniation

**Priority Concepts:** Mobility; Pain

**Reference:** Ignatavicius, Workman, Rebar (2018), pp. 903-904.

751. *Answer:* 1

**Rationale:** The nursing assessment conducted after spinal surgery is similar to that done after other surgical procedures. For this specific type of surgery, the nurse assesses the neurovascular status of the lower extremities, watches for signs and symptoms of infection, and inspects the surgical site for evidence of cerebrospinal fluid leakage (drainage is clear and tests positive for glucose). A mild temperature is expected after insertion of hardware, but a temperature of 101.6° F (38.7° C) should be reported.

**Test-Taking Strategy:** Note the **strategic word**, *most*. **Determine if an abnormality exists.** Thus, you are looking for the option that has the greatest deviation from normal. Options 2 and 4 are expected after surgery and, although the nurse tries to minimize discomfort, the client is likely to have some discomfort, even with proper analgesic use. The words *old* and *outlined* in option 3 indicate that this is not a new occurrence. This leaves the temperature of 101.6° F (38.7° C), which is excessive and should be reported.

**Level of Cognitive Ability:** Analyzing

**Client Needs:** Physiological Integrity  
**Integrated Process:** Nursing Process— Assessment  
**Content Area:** Adult Health: Musculoskeletal  
**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury  
**Priority Concepts:** Clinical Judgment; Infection  
**Reference:** Ignatavicius, Workman, Rebar (2018), pp. 906-908.

752. **Answer:** 2

**Rationale:** In addition to the presence of clinical manifestations, gout is diagnosed by the presence of persistent hyperuricemia, with a uric acid level higher than 8 mg/dL (480 mcmmol/L); a normal value for a male ranges from 4.0 to 8.5 mg/dL (240–501 mcmmol/L) and for a female, from 2.7 to 7.3 mg/dL (160–430 mcmmol/L). Options 1, 3, and 4 indicate normal laboratory values. In addition, the presence of uric acid in an aspirated sample of synovial fluid confirms the diagnosis.

**Test-Taking Strategy:** Focus on the **subject**, manifestation of gout. Use knowledge of normal laboratory values. Recalling that increased uric acid levels occur in gout and noting that the correct option has the only abnormal value will assist you in answering the question.

**Level of Cognitive Ability:** Analyzing  
**Client Needs:** Physiological Integrity  
**Integrated Process:** Nursing Process— Assessment  
**Content Area:** Adult Health: Musculoskeletal  
**Health Problem:** Adult Health: Musculoskeletal: Gout  
**Priority Concepts:** Cellular Regulation; Clinical Judgment  
**Reference:** Lewis et al. (2017), pp. 1026, 1532-1534.

753. **Answer:** 4

**Rationale:** Buck's (extension) traction is a type of skin traction often applied after hip fracture before the fracture is reduced in surgery. Traction reduces muscle spasms and helps immobilize the fracture. Traction does not allow for bony healing to begin or provide rigid immobilization. Traction does not lengthen the leg for the purpose of preventing blood vessel severance. This type of traction involves pulleys and wheels, not pins and screws.

**Test-Taking Strategy:** Focus on the **subject**, use of traction following a hip fracture. Read each option carefully and note that each option has more than one part. All parts of the option need to be correct in order for the answer to be correct. Noting the words *provides comfort* and *fracture immobilization* will direct you to the correct option.

**Level of Cognitive Ability:** Applying  
**Client Needs:** Physiological Integrity  
**Integrated Process:** Nursing Process— Implementation  
**Content Area:** Adult Health: Musculoskeletal  
**Health Problem:** Adult Health: Musculoskeletal: Skeletal Injury  
**Priority Concepts:** Clinical Judgment; Mobility  
**Reference:** Lewis et al. (2017), p. 1470.