

Arthroplasty

Most musculoskeletal surgical procedures are performed to repair damaged joints, particularly the knees and the hips.

Arthroplasty refers to the surgical removal of a diseased joint due to osteoarthritis, osteonecrosis, rheumatoid arthritis, trauma, or congenital anomalies, and replacing it with prosthetics or artificial components made of metal and/or plastic.

Total joint arthroplasty, also called total joint replacement, involves replacement of all components of an articulating joint.

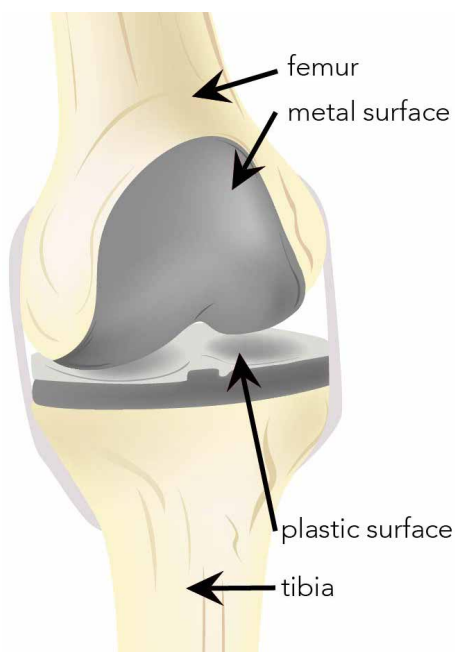
Total knee arthroplasty involves the replacement of the distal femoral component, the tibia plate, and the patellar button. Total knee arthroplasty is a surgical option when conservative measures fail. (68.1)

Unicondylar knee replacement is done when a client's joint is diseased in one compartment of the joint.

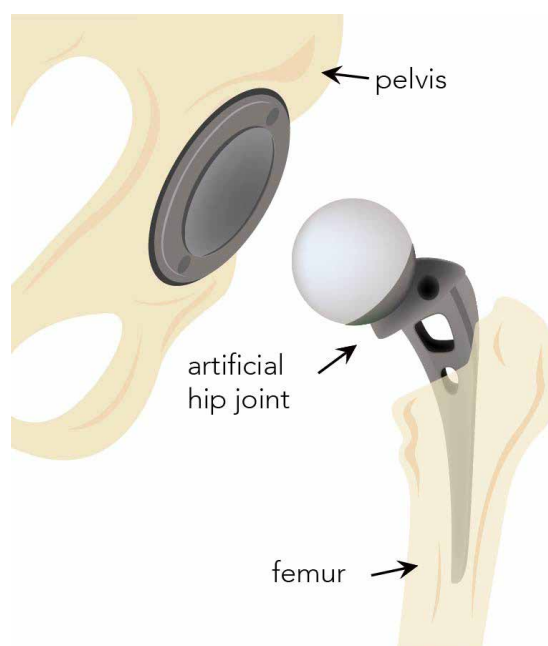
Total hip arthroplasty involves the replacement of the acetabular cup, femoral head, and femoral stem. (68.2)

Hemiarthroplasty refers to half of a joint replacement. Fractures of the femoral neck can be treated only with the replacement of the femoral component.

68.1 Artificial knee joint



68.2 Artificial hip joint



INDICATIONS

The goal of both hip and knee arthroplasty is to eliminate pain, restore joint motions, and improve a client's functional status and quality of life.

POTENTIAL DIAGNOSES

- Knee and hip arthroplasty treats degenerative disease (osteoarthritis, rheumatoid arthritis).
- Osteonecrosis is a necrosis of the bone secondary to lack of blood flow with trauma or chronic steroid therapy as the cause.

CLIENT PRESENTATION

- Pain when bearing weight on the joint (walking, running)
- Joint crepitus and stiffness
- Joint swelling (primarily occurs in the knees)

CONSIDERATIONS

CONTRAINDICATIONS

- Recent or active infection (urinary tract infection), which can cause micro-organisms to migrate to the surgical area and cause the prosthesis to fail
- Arterial impairment to the affected extremity
- Client inability to follow the postsurgical regimen
- A comorbid condition (uncontrolled diabetes mellitus or hypertension, advanced osteoporosis, progressive inflammatory condition, unstable cardiac or respiratory conditions)

PREPROCEDURE

NURSING ACTIONS: Review diagnostic test results.

- **CBC, urinalysis, electrolytes, BUN, creatinine:** Assess surgical readiness, and rule out anemia, infection, or organ failure. Epoetin alfa may be prescribed several weeks preoperatively to increase Hgb for a client who has mild anemia.
- **Chest x-ray:** Rule out pulmonary surgical contraindications (infection, tumor).
- **ECG:** Gather baseline rhythm to identify cardiovascular surgical contraindications (dysrhythmia).

CLIENT EDUCATION

- Teach the client that postoperative care includes incentive spirometry, transfusion, surgical drains, dressing, pain control, transfer, exercises, and activity limits.
- Teach the client about autologous blood donation. The client donates blood prior to procedure to be used during or after the procedure.
- Remind the client to scrub the surgical site with a prescribed antiseptic soap the night before and the morning of surgery to decrease bacterial count on skin, which helps lower the chance of infection.
- Instruct the client to wear clean clothes and sleep on clean linens the night before surgery.
- Tell the client to take antihypertensive and other medications the surgeon allows with a sip of water the morning of surgery.

INTRAPROCEDURE

- General or spinal anesthesia can be used.
- Joint components are removed and replaced with artificial components.
- Components can be cemented in place. Components that do not use cement allow the bone to grow into the prosthesis to stabilize it. Weight bearing is delayed several weeks until the femoral shaft has grown into the prosthesis.

POSTPROCEDURE

CLIENT EDUCATION

- The client requires extensive physical therapy to regain mobility. The client can be discharged home or to an acute rehabilitation facility. If discharged home, outpatient or in-home therapy must be provided. Home care should be available for 4 to 6 weeks.
- Monitor for evidence of incisional infection (fever, increased redness, swelling, purulent drainage).
- Care for the incision (clean daily with soap and water).
- Monitor for deep vein thrombosis (swelling, redness, pain in calf), pulmonary embolism (shortness of breath, chest pain), and bleeding if the client is taking an anticoagulant.

Knee arthroplasty

NURSING ACTIONS

- Provide postoperative care, and prevent postoperative complications (venous thromboembolism developing into deep vein thrombosis [DVT], which can lead to a pulmonary embolism, anemia, infection, neurovascular compromise).
- Older adult clients are at a higher risk for medical complications related to chronic conditions, including hypertension, diabetes mellitus, coronary artery disease, and obstructive pulmonary disease. ☹
- A continuous passive motion (CPM) machine may be prescribed to promote motion in the knee, promote circulation, and prevent scar tissue formation. CPM is usually placed and initiated immediately after surgery. CPM provides passive range of motion from full extension to the prescribed amount of flexion. Follow the prescribed duration of use, but turn it off during meals.
- Positions of flexion of the knee are limited to avoid flexion contractures.
 - Avoid knee gatch and pillows placed behind the knee.
 - Place one pillow under the lower calf and foot to cause a slight extension of the knee joint and to prevent flexion contractures. The knee can also rest flat on the bed.
- To prevent pressure ulcers from developing on the heels, place a small blanket or pillow slightly above the ankle area to keep heels off the bed.

- Provide medications as prescribed. Focus needs to be about pain medications. This promotes client participation in early ambulation.
 - **Analgesics:** Opioids (epidural, PCA, IV, oral), NSAIDs
 - **Peripheral nerve blockade:** Inject the femoral or sciatic nerve with a local anesthetic, or the client can receive a continuous infusion of local anesthetic directly into sciatic or femoral nerve.
 - A continuous peripheral nerve block provides localized pain relief.
 - Monitor for systemic effects of local anesthetic, such as metallic taste in the mouth, tinnitus, slurred speech, decreased respiratory rate, hypotension, bradycardia, restlessness, or seizure.
 - **Antibiotics:** Prophylaxis is generally administered 30 min before the surgical incision is made and postoperatively to prevent infection.
 - **Anticoagulant:** Warfarin, fondaparinux, rivaroxaban, or low-molecular-weight heparin, such as enoxaparin. The client can have a prescription for sequential compression devices, foot pumps, and/or antiembolism stockings to prevent venous thromboembolism formation that can develop into DVT.
- Apply ice or cold therapy to the incisional area to reduce postoperative swelling.
- Monitor neurovascular status of the surgical extremity (movement, sensation, color, pulse, capillary refill) every 2 to 4 hr, and compare with the contralateral extremity.
- Assess frequently for overt bleeding and manifestations of hypovolemia, such as hypotension and tachycardia.
- Monitor the compression bandage and wound suction drain for excessive drainage.
- Monitor the autotransfusion drainage system, if used, and re-infuse blood as prescribed.

CLIENT EDUCATION: Dislocation is not common following total knee arthroplasty. However, kneeling and deep-knee bends are limited indefinitely.

Hip arthroplasty

NURSING ACTIONS

- Provide postoperative care, and prevent complications.
- Check the dressing site frequently, noting any evidence of bleeding. Monitor and record drainage from surgical drains.
- Monitor daily laboratory values, including Hgb and Hct levels. Hgb and Hct can continue to drop for 48 hr after surgery. Autologous blood from presurgery donation or blood salvaged intraoperatively or postoperatively using collection devices may be used for postoperative blood replacement. Blood transfusions are relatively common for Hgb levels less than 9 g/dL.
- Monitor the neurovascular status of the surgical extremity (movement, sensation, color, pulse, capillary refill, and compare with contralateral extremity) every 2 to 4 hr.
- Provide medications as prescribed.
 - **Analgesics:** Opioids (epidural, PCA, IV, oral), NSAIDs
 - **Antibiotics:** Generally administered 30 min before the surgical incision is made as a prophylaxis, and postoperatively to prevent infection
 - **Anticoagulant:** Warfarin, dalteparin, fondaparinux, rivaroxaban, or low-molecular-weight heparin, such as enoxaparin
- Provide early ambulation.
 - Transfer the client out of bed from his unaffected side into a chair or wheelchair.
 - Weight-bearing status is determined by the orthopedic surgeon and by choice of cemented (usually partial/full weight-bearing as tolerated) vs. non-cemented prostheses (usually only partial or minimal weight-bearing [toe touch] until after a few weeks of bone growth).
 - Use assistive (walker) and adaptive (raised toilet seat, grab bars, and shower chairs) devices when caring for the client. **Qs**
 - Apply ice to the surgical site following ambulation as a nonpharmacological measure to decrease pain and discomfort.
- Place the client supine with the head slightly elevated and the affected leg in a neutral position. Place a pillow or abduction device between the legs when turning to the unaffected side. The client should not be turned to the operative side, which could cause hip dislocation.
- Use total hip precautions to prevent dislocation of the new joint.
- Monitor for new joint dislocation: acute onset of pain, reports hearing “a pop,” internal rotation of the affected extremity, and shortened affected extremity.

CLIENT EDUCATION

- Arrange for and instruct the client about the use of raised toilet seats, and care items (long-handled shoehorn, dressing sticks).
- Teach the client to follow position restrictions to avoid dislocation.
 - Use elevated seating and a raised toilet seat.
 - Use straight chairs with arms.
 - Use an abduction pillow or regular pillow, if prescribed, between the legs while in bed (and with turning, if restless, or in an altered mental state).
 - Externally rotate the toes.
 - Use extended handles on shoehorns and dressing sticks to prevent flexion greater than 90°.
 - Avoid flexion of hip greater than 90°.
 - Avoid low chairs.
 - Do not cross the legs.
 - Do not internally rotate the toes.
 - Avoid turning to the operative side, unless prescribed.

COMPLICATIONS

HIP ARTHROPLASTY

Venous thromboembolism

Can develop into a DVT resulting in a pulmonary embolism, a life-threatening complication after total hip arthroplasty

NURSING CONSIDERATIONS

- Monitor for manifestations of pulmonary embolism, including acute dyspnea, tachycardia, and pleuritic chest pain.
- Follow venous thromboembolism prophylaxis to include pharmacological management, antiembolic stockings, and sequential compression devices or foot pumps while in bed.
- Encourage plantar flexion, dorsiflexion, and circumduction exercises to prevent clot formation.
- Encourage early ambulation with physical and occupational therapy.

Hip dislocation, infection, anemia, neurovascular compromise

NURSING CONSIDERATIONS

- Older adult clients are at an increased risk for medical complications related to chronic conditions, including hypertension, diabetes mellitus, coronary artery disease, and obstructive pulmonary disease. ☹
- Older adult clients are at the greatest risk for a potentially life-threatening complication (venous thromboembolism formation that develops into DVT, pulmonary emboli) due to age and compromised circulation before surgery.
- Clients who are obese or who have a history of venous thromboembolism formation are also at increased risk for developing DVT or pulmonary emboli.
- Monitor for bleeding.

Application Exercises

1. A nurse is reviewing the health record of a client who is to undergo total joint arthroplasty. The nurse should recognize which of the following findings as a contraindication to this procedure?
 - A. Age 78 years
 - B. History of cancer
 - C. Previous joint replacement
 - D. Bronchitis 2 weeks ago
2. A nurse is admitting a client to the orthopedic unit following a total knee arthroplasty. Which of the following actions by the nurse are appropriate? (Select all that apply.)
 - A. Check continuous passive motion device settings.
 - B. Palpate dorsal pedal pulses.
 - C. Place a pillow behind the knee.
 - D. Elevate heels off bed.
 - E. Apply heat therapy to incision.
3. A nurse is planning discharge teaching for a client who had a total hip arthroplasty. Which of the following should the nurse include in the teaching? (Select all that apply.)
 - A. Clean the incision daily with soap and water.
 - B. Turn the toes inward when sitting or lying.
 - C. Sit in a straight-backed armchair.
 - D. Bend at the waist when putting on socks.
 - E. Use a raised toilet seat.
4. A nurse is assessing a client who is scheduled to undergo a right knee arthroplasty. The nurse should expect which of the following findings? (Select all that apply.)
 - A. Skin reddened over the joint
 - B. Pain when bearing weight
 - C. Joint crepitus
 - D. Swelling of the affected joint
 - E. Limited joint motion
5. A nurse is completing a preoperative teaching plan for a client who is scheduled to have a total hip arthroplasty. Which of the following should the nurse include in the teaching plan? (Select all that apply.)
 - A. Encourage complete autologous blood donation.
 - B. Sit in a low reclining chair.
 - C. Instruct the client to roll onto the operative hip.
 - D. Use an abductor pillow when turning the client.
 - E. Perform isometric exercises.

PRACTICE Active Learning Scenario

A nurse is preparing to administer enoxaparin to a client who had a total knee arthroplasty. What should the nurse consider before administering the medication? Use the ATI Active Learning Template: Medication and the Pharmacology Review Module to complete this item.

EXPECTED PHARMACOLOGICAL ACTION: Define.

NURSING INTERVENTIONS: List two nursing interventions.

CLIENT EDUCATION: List three client teaching points.

Application Exercises Key

1. A. Age greater than 70 is not a contraindication for a total joint arthroplasty unless there are comorbidity factors.
B. History of cancer is not a contraindication for a total joint arthroplasty unless there are comorbidity factors.
C. Previous joint arthroplasty surgery is a contraindication for total joint arthroplasty unless there are comorbidity factors.
D. **CORRECT:** The client who recently had bronchitis or a recent infection can cause micro-organisms to migrate to the surgical area and cause the prosthesis to fail.
N NCLEX® Connection: Physiological Adaptation, Pathophysiology
2. A. **CORRECT:** The nurse should check the continuous passive motion device settings to determine if the settings are as prescribed.
B. **CORRECT:** The nurse should assess the strength of the pulses of both lower extremities to help determine adequate circulation.
C. The nurse should place one pillow under the lower calf and foot to cause a slight extension of the knee joint and to prevent flexion contractures. The knee can also rest flat on the bed.
D. **CORRECT:** The nurse should prevent pressure ulcers on the client's heels by elevating the heels off the bed with a pillow.
E. The nurse should apply cold therapy to reduce postoperative swelling.
N NCLEX® Connection: Reduction of Risk Potential, Therapeutic Procedures
3. A. **CORRECT:** The client should wash the surgical incision daily with soap and water to decrease the risk of infection.
B. The client should externally rotate toes to prevent dislocation of the hip prosthesis.
C. **CORRECT:** Using a straight-backed armchair decreases the chance of bending at a greater than 90° angle, which can cause dislocation of the hip prosthesis.
D. Bending at the waist places the hip in a position greater than a 90° angle, which can cause dislocation of the hip prosthesis.
E. **CORRECT:** Using a toilet riser decreases the chance of bending greater than 90°, which can cause dislocation of the hip prosthesis.
N NCLEX® Connection: Reduction of Risk Potential, Potential for Complications of Diagnostic Tests/Treatments/Procedures
4. A. Skin over the knee that is red can indicate infection and is not an expected finding.
B. **CORRECT:** Pain when bearing weight is an expected finding due to degeneration of the joint.
C. **CORRECT:** Joint crepitus due to degeneration of the joint tissue is an expected finding.
D. **CORRECT:** Swelling of the affected joint due to degeneration of the joint tissue is an expected finding.
E. **CORRECT:** Limited joint motion is due to degeneration of the joint tissue and is an expected finding.
N NCLEX® Connection: Physiological Adaptation, Alterations in Body Systems
5. A. **CORRECT:** The nurse should encourage the client to donate blood that can be used postoperatively.
B. The nurse should have the client sit in a hard back chair to keep the hip at a 90° angle. This prevents dislocation.
C. The nurse should avoid turning the client to the operative side to prevent dislocation of the prosthesis.
D. **CORRECT:** The nurse should place an abductor device or pillow between the client's legs when turning to prevent dislocation of the affected hip.
E. **CORRECT:** The nurse should instruct the client to perform isometric exercises to prevent blood clots and maintain muscle tone.
N NCLEX® Connection: Reduction of Risk Potential, Therapeutic Procedures

PRACTICE Answer

Using ATI Active Learning Template: Medication

EXPECTED PHARMACOLOGICAL

ACTION: Enoxaparin is an anticoagulant. Use low molecular-weight heparin after abdominal and orthopedic surgery to prevent deep vein thrombosis that may lead to pulmonary embolism.

NURSING INTERVENTIONS

- Do not expel the air bubble from the syringe before injection. It's nitrous oxide and allows the client to receive all the medication during the injection.
- Rotate injection sites.
- Monitor for manifestations of unexplained bleeding.

CLIENT EDUCATION

- Encourage the use of a soft toothbrush and shaving with an electric razor to prevent bleeding.
- Avoid over-the-counter medication unless prescribed by a provider.
- Don't take enoxaparin with garlic, ginger, ginkgo, or feverfew. These supplements may increase the risk of bleeding.

N NCLEX® Connection: Pharmacological and Parenteral Therapies, Expected Actions/Outcomes