

# Total Hip Arthroplasty

## Surgical Indications and Considerations

*Anatomical Considerations:* The hip joint is a multiaxial ball and socket joint that has maximum stability because of the deep insertion of the head of the femur into the acetabulum. The acetabulum is formed by fusion of part of the ilium, ischium, and pubis. The acetabulum faces anteriorly, laterally, and caudally. Three strong ligaments support the hip: the iliofemoral, the ischiofemoral, and the pubofemoral ligaments. The tensor fascia lata, the gluteus maximus, and the thick condensation of fascia known as the iliotibial band form the outer layer of the muscular envelope. One of these must be split to gain access to the hip joint. Beneath this outer layer, the gluteus medius and minimus muscles and their insertion into the greater trochanter and joint capsule become a focal point of surgical exposure. The nerves of surgical importance during hip arthroplasty include the lateral femoral cutaneous nerve, femoral nerve, superior and inferior gluteal nerves, and sciatic nerve.

*Pathogenesis:* Total hip arthroplasty (THA) is performed most commonly because of progressively severe arthritis in the hip joint. The most common type of arthritis leading to THA is osteoarthritis (degenerative joint disease) of the hip joint. This type of arthritis is generally seen with aging, congenital abnormality of the hip joint, or prior trauma to the hip joint. Other conditions leading to THA include bony fractures of the hip joint, rheumatoid arthritis, avascular necrosis, and the abnormal muscle tone caused by cerebral palsy. The progressively intense chronic pain together with impairment of daily function including walking, climbing stairs and even arising from a sitting position, eventually become reasons to consider THA.

*Epidemiology:* Total hip arthroplasty is a relatively common procedure with more than 100,000 performed annually in the United States. Although most of the procedures are performed in patients older than 65 years, at least 25% are performed in patients younger than 55. The majority of these people have tried and failed to find relief from their symptoms with conservative medical intervention.

## *Diagnosis*

- Patients may limp to reduce the forces on the hip
- Decreased hip range of motion
- Severe pain with activity and at rest that is not relieved by conservative intervention
- Radiographs to determine extent of the degenerative process
- MRI scanning to determine avascular necrosis
- Blood tests to rule out systemic arthritis or infection in the hip

*Nonoperative Versus Operative Management:* Total hip replacement (THR) is used to correct intractable damage resulting in osteoarthritis, rheumatoid arthritis, avascular necrosis, and abnormal muscle tone. Nonelective THR procedures are performed for fractures in which open reduction internal fixation is deemed inappropriate. Contraindications for THR surgery include inadequate bone mass, inadequate periarticular support, serious medical risk factors, signs of infection, lack of patient motivation to observe precautions and follow through with

rehabilitation, and if it is unlikely to increase the patient's functional level. The most common complications following THR surgery include thrombophlebitis (DVT), infection, dislocation, and loosening of the joint. Not all hip conditions require a hip replacement as the initial treatment. There are several alternative treatments to put off replacing the hip as long as possible. Physical therapy, walking aids, medications, injections and activity modification can be used to alleviate pain and improve impairments associated with hip disorders.

*Surgical Procedure:* There are two main types of hip replacements, cemented and noncemented. The type of implant used depends on the surgeon's preference, the individual's age, and activity level. Each implant is made up of two parts: the acetabular component, or socket portion, which replaces the acetabulum; and the femoral component, or stem portion, which replaces the femoral head. A cemented implant is held in place by a type of epoxy cement that attaches the metal to the bone. A noncemented implant has a fine mesh of holes on the surface area that touches the bone. The mesh allows the bone to grow into the mesh and become part of the bone. Many surgeons believe that noncemented femoral components should not have weight borne on them for 6 weeks, whereas cemented femoral components can support weight immediately after surgery. There are various surgical approaches for THA including anterior, anterolateral, posterior, lateral, and combined methods. The posterior approach is probably the most commonly used approaches for THA primarily because it avoids displacement of the abductor mechanism. The posterolateral approach requires precaution instructions that prohibit flexion of the hip past 90 degrees, adduction past the body's midline, and internal rotation of the hip. After an anterolateral THR the patient should observe these precautions and avoid external rotation (especially with flexion). Minimally invasive techniques and mini-incision THR have been pursued by various surgeons to decrease the perioperative complications associated with larger and more extensile approaches and to speed the recovery of patients after THR.

### *Preoperative Rehabilitation*

- Educate patient regarding total hip replacement precautions:
  - Do not flex or bend the hip more than 90 degrees
  - Do not twist or pivot on the operated leg
  - Keep legs apart and do not cross them at the knees or ankles
- Help patient become independent in exercise for postoperative phases.
- Instruction in use of assistive devices such as walker and crutches according to the weight-bearing status after a noncemented THR depending on the surgeon's discretion.

## POSTOPERATIVE REHABILITATION

Note: The following rehabilitation progression is a summary of the guidelines provided by Pratt and Gray. Refer to their publication to obtain further information regarding criteria to progress from one phase to the next, anticipated impairments and functional limitations, interventions, goals, and rationales.

### **Phase I Hospital Phase:** Days 1-2

Goals: Prevent complications – especially dislocation  
Increase muscle contraction and control of involved leg  
Help patient sit for 30 minutes

Intervention:

#### Day 1

- Adjust abduction pillow
- Provide patient education regarding total hip precautions
- Begin exercises including: ankle pumps, quadriceps sets, gluteal sets, and upper extremity exercises
- Encourage use of cough and incentive spirometer

#### Day 2

- Progress exercise program to include heel slides, isometric or active assistive hip abduction and short arc quadriceps sets
- Bed mobility training
- Transfer training
- Gait training as appropriate (using a front-wheeled walker or crutches)

### **Phase II:** Days 3-7

Goals: Promote transfers and gait independence  
Continue to reinforce THR precautions  
Discharge to home

Intervention:

- Continue interventions from phase I with progression of activity as tolerated
- Active range of motion with hip abduction, terminal knee extension, and upper extremity exercises
- Bed mobility training
- Transfer training; initiate car transfers when appropriate
- Gait training; initiate stair training when indicated (“up with good, down with bad”)
- Evaluation of equipment needs at home
- Caregiver training

### **Phase III Return to Home (Home Care Phase):** Weeks 1-6

Goals: Increase patient independence with gait and transfers  
Evaluate safety of home  
Plan return of patient to work or previous activities as indicated

Intervention:

- Closed-chain exercises such as heel raises and mini squats
- Cautious stretching of Achilles tendons in the standing position

- Progress from the use of a front-wheeled walker or crutches to single-point cane, this usually occurs 3-4 weeks after surgery (Use of cane is often discontinued after 3-4 more weeks)
- Normalize gait on level and sloped surfaces, jagged sidewalks, curbs, and stairs
- Car transfer instruction and practice

Note: Physical therapy intervention usually ends with the home care phase. Phase IV is for patients with physically demanding lifestyles, patients who have lingering gait problems or did not meet home care status requirements at the time of hospital discharge.

#### **Phase IV Outpatient Clinic**

Goals: Improve strength, endurance, and balance  
 Correct gait impairments  
 Independence with home exercise program

Intervention:

- Strength, endurance and balance training
- Pool exercise
- Stationary bicycling, simulated cross-country skiing, and treadmill (as part of gym program)

Selected References:

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