

Total Hip Replacement

1. Defined
 - a. A total hip replacement involves the replacement of the femoral head and acetabular socket. It is often used to correct damage resulting from osteoarthritis, rheumatoid arthritis, avascular necrosis, severe fractures and the abnormal muscle tone associated with some neurological conditions. The femoral head is replaced with an artificial head and stem component secured in the medullary canal of the proximal femur. The acetabulum is then shaped and fitted with a corresponding cap.
 - b. The posterolateral surgical approach will access the hip in the space between the gluteus maximus and minimus. The capsule and short external rotators are released, and the hip is dislocated posteriorly.
 - c. The anterolateral surgical approach uses the interval between the gluteus medius and the tensor fascia lata. The superior gluteal nerve near the ilium innervates both muscles and is to be avoided with great care by the surgeon. The anterolateral approach is advocated now by *some* surgeons as possibly decreasing the incidence of posterior dislocation. This approach may create more anterior muscle soreness postoperatively.
2. Goals
 - a. Protect healing tissue
 - b. Control post-operative pain and swelling
 - c. Improve post-operative range of motion
 - d. Improve functional strength, stability, and neuromuscular control
3. Rehabilitation Principles
 - a. Be aware of the concept of joint reactivity
 - i. Be aware of postoperative joint irritation/inflammation
 - ii. Understand the concept of nerve regeneration and the resulting paresthesia that may result from a total hip incision
 - iii. Respect the surgical precautions, especially the specific precautions that are specified by each individual surgeon (global precautions: no flexion past 90 degrees, no adduction past the midline, no significant internal rotation with posterolateral approach; no significant extension past 0 degrees or external rotation additionally with the anterior approach)
 - iv. Avoid early open chain exercises (flexion straight leg raise) that may create shear force on the irritated, anterior muscle group after the anterior surgical approach. Avoid increased repetitions of

- abduction straight leg raises with an irritated hip replacement of any approach
- v. The “minimally invasive” surgical approach does not imply that the stability of the replacement itself can be stressed/challenged at a significantly earlier stage
 - vi. Wound healing problems are more prevalent in patients with concomitant medical issues like diabetes and peripheral vascular disease
- b. Tissue reactivity of the hip and tissue healing will dictate the rehabilitation process. Reactivity is determined by the clinical exam. **Always respect the surgical precautions.**
- i. Level I Reactivity
 - 1. Resting pain, pain before end range
 - 2. Aggressive stretching is contraindicated
 - 3. No violation of precautions
 - ii. Level II Reactivity
 - 1. Pain onset occurs with end range resistance (or limit of precautions)
 - 2. Aggressive stretching is contraindicated
 - 3. No violation of precautions
- c. Eliminate inflammation as the cause of pain and neuromuscular inhibition
- i. Initiate early, easy range of motion activities with light stretching and some controlled, assisted weight bearing.
 - ii. Limit muscular inhibition and atrophy from effusion.
 - iii. Initiate early activity of quads and gluteal muscles with isometric contractions. Eventually progress to some active-assisted and active range of motion activities.
- d. Ensure return of appropriate joint arthrokinematics
- e. Apply stretching techniques with adequate leg support, precaution adherence and avoid any irritation of the joint structure.
- f. Identify incision or surface complications early in the rehab process. Identify any possibility of blood clotting. Also identify global health complications (severe GI complications, severe blood pressure changes, mental status changes, severe shortness of breath, and an inability to function safely/independently at home) that may necessitate a call to family members or the appropriate physician.
- g. Encourage complete compliance with all postoperative MD directions (anticoagulants, incision care, showering – bath stool until MD clears for bath, stocking compliance – 23 hours a day until no swelling for 24 hour period or if swelling is gone in the morning)
- h. Encourage life-long activity modification. No heavy lifting from the ground or floor. No high impact recreational activities (running, singles tennis, basketball, etc..). No downhill skiing.
- i. Factors that affect the rehab process
- i. Surgical approach
 - ii. Tissue quality

- iii. Presence of concomitant pathology
- iv. Age of patient
- v. Comorbidities
- vi. Pre and intra-operative range of motion
- vii. Pain and sensitivity levels
- viii. Cognitive abilities

4. Post op functional guidelines

- a. Requires input from physician
 - i. May reference physician preferences
- b. Dependent on functional range, strength, and neuromuscular control
- c. Postoperative Guidelines/Precautions (approximately 3 months – **MD specific**)
 - i. Posterolateral approach:
 - No combined motions of hip flexion, adduction, and internal rotation
 - No hip flexion greater than 90 degrees
 - No hip extension beyond neutral, at least initially
 - No internal rotation of the hip beyond neutral when in flexion
 - No lumbar/pelvic twisting
 - Sleep only on operated side with a pillow between legs or sleep on back (at least 8 - 12 weeks)
 - Use elevated toilet seat
 - Use assistive device to help with placing socks on and off (at least 6-8 weeks)
 - Avoid low chairs and couches
 - ii. Anterior approach:
 - No hip flexion greater than 90 degrees
 - No extension of the hip beyond neutral (no extension to the point of significant pain)
 - Caution with early bridging (anterior tissue/incision stress)
 - No prone lying
 - No combined hip motions of extension and external rotation
 - No pelvic/lumbar twisting
 - Sleep only on operated side with a pillow between legs or sleep on back
 - Use elevated toilet seat
 - Use assistive device to help with placing socks on and off (at least 6-8 weeks)
 - Avoid low chairs and couches

- d. Drive
 - i. Refer to directions specifically given by MD (MD preferences)
 - ii. Refer patient to drug precautions
 - iii. Refer patient to auto insurance coverage
 - iv. Dependent on left or right involvement
 - v. Often times, if a patient is safe and confident, they can begin practicing after the third week
- e. Work
 - i. Sedentary – usually recommended by MD’s to take at least a month unless job is very sedentary and patient allowed to bring crutches
 - ii. Medium to high physical demand level: 12-16+ weeks, which will be communicated by MD
- f. Sports
 - i. Golf – typically at least 4 months after surgery. “Reverse golf” – start with chip shots and move progressively further from the green. Encourage increased caution with tee shots – most patients should limit their backswing for the first few months, until they are more comfortable/confident with their hip. Some golfers may need to limit the backswing even in the long term.
 - ii. Doubles tennis – typically at least 4 months after surgery. Limit the range of the swing initially, until patient is more confident/comfortable.
 - iii. Biking – typically at least 4 months after surgery. Patient should be encouraged to avoid large inclines/declines as well as high speeds, especially for the first few months.

5. Post op equipment guidelines

- a. Abduction Pillow
 - i. MD specific
 - ii. Will use in hospital and may continue at home
 - iii. Patient may not discontinue until receiving MD clearance
- b. Brace (Abduction brace)
 - i. May be given in hospital, depending on MD preference
 - ii. Patient may not discontinue until receiving MD clearance
- c. Assistive devices (crutch, cane, walker)
 - i. Walker typically to start with (sometimes given crutches instead)
 - ii. May move to a cane or crutch when independent, safe and possessing 4/5 gluteus medius strength

6. Rehabilitation for the total hip replacement:

a. Week 1-6: Protective Initiation Phase

- i. Precautions/Limits:
 - 1. Swelling and effusion
 - 2. Post-op muscle inhibition
 - 3. Safety with mobility

4. Adherence to precautions
 5. Avoidance of tissue irritation, especially near incision site.
 6. No flexion straight leg raises with anterior surgical approach without prior approval
- ii. Clinical Expectations by the end of week 6:
1. ROM: 0 to 80 degrees of hip flexion. 30 degrees of abduction.
 2. Good quad tone (4+/5)
 3. Ability to ambulate with assistive device independently
 4. 4-/5 abductor strength
- iii. Treatment
1. PROM of the hip/knee within precautions.
 2. Quad sets, short arc quad/long arc quad exercises.
 3. Gluteal sets initially, as well as ankle pumps.
 4. Isometric hip abduction with self resistance or pilates ring/belt – progressing into supine clamshell exercises with theraband.
 5. If patient is able to perform a hip abduction with assistance comfortably, they can begin to perform this motion actively in the supine position.
 6. Flexion SLR if posterolateral approach – avoid anterior muscle irritation. (AVOID with anterior approach).
 7. Leg extension machine with conscious recognition of precautions and appropriate seat height to avoid hip flexion greater than 90 degrees.
 8. Gait training with extreme emphasis on safety. Walker transitioning to cane if independent and 4/5 abduction strength. Any loss of balance with change of direction would necessitate more assistance. Avoidance of Trendelenburg gait should also be a point of emphasis.
 9. Calf raises with avoidance of overexertion on gastroc/soleus complex.
 10. Standing hip flexion and abduction (within precautions) with emphasis on pain-free performance and avoidance of body compensation. Patient will need to use upper extremities for support.
 11. Leg press in a very short range initially with emphasis on bilateral, equal gluteal/quadricep performance.
 12. Anterior step-ups with UE support and a heavy emphasis on pelvic control and gluteal contraction.
 13. Careful single leg stance activities with UE support and avoidance of Trendelenburg appearance. Must be a pain free performance with short hold time initially.
 14. Patient may perform gentle, standing hip flexor stretch.
 15. Abdominal bracing exercises to initiate core control and early allowance of hip disassociation.

16. Stationary bicycling may begin toward 4-6th week if no flexion greater than 90 degrees.
17. Transfer (sit – stand) practice with various heights and cueing/education for execution.

b. Week 6 – 12/16:

- i. Precautions/Limits
 1. Adherence to general THR precautions (dependent upon surgical approach yet)
 2. No unsafe ambulation or gait deviations (may need assistive device yet)
 3. No aggressive strengthening which creates tissue irritation
- ii. Clinical Expectations by the end of week 12:
 1. 4/5 to 4+/5 abductor strength
 2. 5-/5 quad strength
 3. 4+/5 hip flexor strength
 4. mild limp or Trendelenburg appearance with gait pattern
- iii. Treatment
 1. May initiate bridging exercises, especially if posterolateral approach.
 2. Balance exercises that place emphasis on movement in frontal plane.
 3. Leg press strengthening (no flexion greater than 90 degrees) – progress to single leg if safe and comfortable.
 4. Pelvic ‘drop’ exercise can be initiated if proper safety and control is demonstrated by patient
 5. Progression of step-ups with increase in height if proper form and avoidance of irritation.
 6. Continuation of single leg stance activities.
 7. Continuation of any quadriceps strengthening.
 8. Progression of “core” control exercises to allow greater rate of hip disassociation.
 9. Progression of standing hip strengthening with ankle weights or multi-angle machine.
 10. Continue any necessary stretching.
 11. Proprioception training on unsteady surfaces (Dynadisc, Airex, BOSU ball, trampoline).
 12. Aquatic therapy and resistance work/ambulatory training to assist in normalization of gluteal/pelvic control and qualitative gait appearance

c. Week 12/16++

- i. Precautions/Limits
 - 1. Adherence to general THR precautions (until cleared by MD)
- ii. Clinical Expectations:
 - 1. Normalization of gait
 - 2. Return to all desired activities (unless unapproved)
- iii. Treatment
 - 1. Sport related functional training
 - 2. Resumption of desired cardiovascular training (bike, elliptical, swimming with MD clearance) with proper qualitative performance and resulting stamina increase
 - 3. Development of independent progressive resistance program (to be continued at fitness facility of choice)
 - 4. Continual advancement of closed chain hip strength and pelvic control
 - 5. Aquatic activities that assist with strength and gait advancement
 - 6. Continuance of any previously beneficial therapeutic exercises/interventions