IAN S. RICE, MD
SPORTS MEDICINE ORTHOPEDIC SURGEON

Total Knee Replacement Protocol

Pre-op Physical Therapy

- Patient may be referred for 1-2 pre-op PT visits for instruction in gait with appropriate assistive device, and post-op knee rehab exercises

Phase I – Immediate post-operative phase

Goals:

- Educate the patient on precautions to protect the repair
- Decrease pain and inflammation
- Stimulate quad function
- Attain PROM – especially patellar mobility and full extension by 1-2 weeks
- Increase knee flexion ROM to at least 90 degrees by 1-2 weeks
- Teach proper gait with crutches and brace/weight bearing as tolerated
- Improve neuromuscular control

Immobilization

- Knee immobilizer is worn for gait for generally for the first 1 week.
- Patient can take the knee immobilizer off for exercises but should wear the knee immobilizer for sleeping at night and for ambulation.
- Patient can discontinue the knee immobilizer for ambulation when they are able to perform at least 1 set of 10 reps on SLR-flexion without an extensor lag.
- If patient has difficulty attaining or maintaining full passive knee extension, they should continue to wear the knee immobilizer for sleeping.

CPM:

- Dr. Rice generally does not send a CPM unit home with his patients, however, if the patient likes the CPM and prefers to use it at home, MD is not opposed to this

Assistive Device:

- Patients should ambulate with either a walker or 2 crutches with WBAT unless otherwise directed by physician

Home Health PT vs. Outpatient Physical Therapy

- Patient's are generally in the hospital for 3-4 days and they will receive IP Physical Therapy while in the hospital
- Patient's who are younger and in fairly good condition, can generally begin OP physical therapy at 4-7 days post-op. This can be scheduled at the time that patient schedules their knee surgery.
- Occasionally, patient's who are elderly or very deconditioned may need a very short stint of home health PT. If patient does receive home health PT, it should be no longer than 1-2 weeks with the goal of getting patient into outpatient physical therapy as soon as possible.

Week 1 (1-7 days)

- Ankle pumps throughout the day to prevent DVT and improve circulation to LE

- Seated calf stretch with sheet, seated hamstring stretch, both with towel roll under ankle to promote full extension
- Gait with 2 crutches or walker and WBAT and knee immobilizer in place with knee fully extended
- Patellar mobilization-all directions
- Seated PROM performed with opposite lower extremity
- Focus on obtaining full extension. Overpressure/low load into full passive extension
- Heelslides – may assist with towel if needed
- Quad sets – may use functional e-stim (Russian) on quads as needed
- Glute sets
- Adductor set with ball between legs
- Straight leg raise-flexion (flex,ext, abd) – for flexion –Quad set 1st and provide assistance to keep full extension if there is a lag. May use E-stim (Russsian) on quads for muscle re-education
- Supine active hip abduction or standing in walker active hip abduction
- Ice-Stim for pain control (pre-mod) and swelling (HVG) control
- Vasopneumatic pump for edema control if needed

Days 4-7:

- Straight leg raises –add active hip abduction and extension
- Straight leg raise-continue active hip flexion
- Short Arc Quads (if able)
- Multi-angle quadriceps isometrics foot on floor (30 º, 45 º, 60º)
- Standing weight shifts forward and sideways – progress to knee bend with weight shift
- Calf propping or prone hangs as needed to increase extension – low load to obtain full passive extension
- Standing closed chain terminal knee extension with light band above knee

Goals:

- PROM 0-90
- Quad control sufficient for SLR independently with no lag

Week 2 (8-14 days)

- Gait with 1-2 crutches or walker.

- Gait in therapy—practice correct form: knee flexion in swing, terminal knee extension, weight shift in stance. If patient is ambulating with a flexed knee, practice weight shifts with manual overpressure to increase extension in stance
- Standing mini squats- bilateral LE
- March in place holding on to walker or balance bar
- Bike – for ROM – start with rocking forward and backward
- Standing gastroc stretch
- Add manual hamstring stretch with knee bent
- Add weight to SLR (3 way) if no lag
- Cones – to increase flexion, and practice balance with 1 or 2 crutches (based on tolerance)
- Continue low load long duration stretching seated– 5 –6 minutes to obtain full passive extension
- One leg balance on flat surface as tolerated-May begin holding on to object and progress to unsupported as tolerated
- Standing active hamstring curls
- Progress weight shifts to BOSU on the blue side and then progress to BOSU on the black side

Week 3 (15-21 days)

- Initiate walking program with normal pattern with 1 crutch or cane
- Prone knee flexion ROM assisted with belt/opposite leg
- Calf raises—bilateral
- SAQ (add resistance in 1# increments and progress as tolerated)
- FAQ's (if tolerable)- (add resistance in 1# increments and progress as tolerated)
- Leg Press: using bilateral LE – (40º to extension without locking) Use low weight (10-50% maximum of patients body weight. Add weight only if good control in terminal extension)
- Minisquat holding on to chair or walker – hold 2-3 seconds at 30º flexion
- Increase balance work: unilateral stance eyes open, unilateral stance on airex,
- Pool program: walk forward, backward, sideways, straight leg raise 4 ways, minisquats, stretching, unilateral stance balancing, knee bends (if incision closed)
- Cones: forward, lateral, backward. Change speeds. Land and balance with slightly flexed knee
- Scar and soft tissue massage to quadriceps and hamstrings as needed

Goals:

- ROM 0-100-105
- Good quad control with unilateral stance

Weeks 4

- Continue stretches
- Progress ambulation and wean patient off assistive device as tolerated

- Step up – forward and lateral – start 2 inch
- Leg press: do not twist or lock knee – bilateral and progress to unilateral
- Progress to cable column 3 way hip once patient is able to perform straight leg raises with 3 lbs – do not twist or lock the weight bearing leg
- Progress step up exercises – do not allow knee to twist or knees to pass toes
- Wall squats – make sure knee does not twist or pass toes (begin 0-30, progress to 0-45 and then eventually 0-60 degrees as long as no complains of knee or patellofemoral pain

Goals

- ROM 0-115
- Gait with full extension in stance and flexion in swing without brace or crutches

Intermediate Phase: Weeks 5 –9

Goals

- Normalize gait all surfaces
- Increase strength entire lower extremity: focus on quad, hamstring, gastroc/soleus, gluteus medius and hip ext rotation for correct hip and knee positioning and stability
- Correct posture and control during exercise: knee not passing toes, no valgus at knee (no knee twisting/hip IR), no locking of knee during exercise
- Increase neuromuscular control/balance/proprioception at a variety of hip/knee angles (functional for sport)

Week 5-9

- Step downs as tolerable
- Leg extension machine if no patellofemoral pain-start bilateral and progress to unilateral as tolerated-begin with light resistance and progress as tolerated (when able to do at least 5 lbs. on FAQ's)
- Progress to walking on treadmill or on level surfaces as tolerated
- Increase endurance with walking and stairclimbing as tolerated
- Active and younger patients may be progressed to elliptical machine as tolerated