

Medial Patellofemoral Ligament Reconstruction Protocol

I. Phase I: Proliferation Phase (weeks 0-6)

Phase I: Proliferation Phase Goals:

- Protect fixation and surrounding soft tissues
- Control inflammatory process
- Decrease pain and effusion
- Restoration of full passive knee extension
- Gradual improvement of knee flexion
- Regaining quadriceps control

Brace:

- Patient will be in knee immobilizer locked in full extension for ambulation and sleeping. Knee Immobilizer can be taken off knee ROM.

Weight Bearing:

- Please check with physician for WB status as this varies based on the specific surgical procedure.
- Generally patients will be allowed FWB at 3 weeks with brace locked. Out of brace at 6 weeks.

Swelling Control

- Ice, elevation, compression, and modalities as needed to decrease swelling

Range of Motion (ROM)

- Immediate motion exercise day 2
- Full passive knee extension immediately
- No active knee extension for 6 weeks
- Motion exercises throughout the day
- Active knee flexion ROM at least 3-4 times daily
- Limit active flexion to 90 degrees for the first 6 weeks
- If patient has difficulty regaining knee flexion ROM, can use AA knee flexion
- Patellar mobilization (3-4 times per day): Medial, Superior, Inferior (NO lateral mobilization secondary to medial patellofemoral ligaments and VMO being surgically repaired)

Minimum ROM goals

- Week 1-2: 0-30 degrees
- Week 3: 0-90 degrees
- Week 4: 0-110 degrees
- Week 6: Full

Strengthening Program:

- Quadriceps Sets, Glut Sets, Adductor Sets
- Straight leg raises-4 ways in brace, or with assistance to keep knee straight
8 sets of 10 repetitions-gradually increase weights in 1 lb increments up to 5-7 lbs.
- Electrical muscle stimulation and/or biofeedback during quadriceps exercises

Functional Activities:

- Gradual return to daily activities with crutches and NWB or PWB per MD discretion
- If symptoms occur, reduce activities to reduce pain and inflammation
- Extended periods of standing and walking should be avoided

Day 2 Post-op

- Ambulation-2 Crutches and NWB or PWB per MD discretion
- Perform dressing change-notify MD if any signs of excessive drainage, signs of infection or DVT or any other potential complications
- Can use vasopneumatic pump and cryotherapy to decrease swelling
- High volt galvanic stimulation (HVG) can also be used along with ice to decrease swelling
- Patient should be instructed to keep leg elevated (knee fully extended), wear ace bandage and to ice knee for 15-20 minutes at least 4-5 times per day
- Pre-modulation or interferential electrical stimulation can be used to decrease post-operative pain
- Biofeedback and/or electrical muscle stimulation can be used to facilitate quadriceps contraction
- Patellar mobilization-medial, superior and inferior (No lateral glides secondary to PF ligament and/or VMO repair)
- Long sit hamstring stretch
- Gastroc stretch with towel
- Ankle pumps to prevent lower leg edema and to prevent DVT
- Patient can begin active knee flexion seated over the edge of the bed or table (limit to 90 degrees flexion unless MD directs ROM limitation differently)
- If patient can not get knee fully extended, perform heel prop in supine to get full passive extension
- Quad sets, gluteal sets, adductor sets in supine
- SLR-Hip Flexion, Hip Abduction, Hip Extension in brace locked in extension (assist as needed)

Week 1 Post-op

- Continue to use Biofeedback and/or electrical muscle stimulation
- May begin active heel slide for knee flexion
- SLR-Hip Adduction if patient is able to do without difficulty and increased medial knee pain
- Add weights for SLR-Hip Flexion, Abduction and Extension and progress as tolerated

Weeks 2-3 Post-op

- Continue passive knee extension if patient doesn't have full knee extension
- Continue Active knee flexion up to 90 degrees
- Patient with moderate knee swelling may benefit from a compression sleeve with PF cutout
- Manual hamstring and gastroc stretches in supine
- Scar massage to improve scar mobility
- Continue to increase resistance for 4 way SLR's

Week 4-5 Post-op

- Gravity Assisted Supine Knee Flexion to 90 degrees
- AA Knee Flexion using other leg if patient having difficulty regaining knee flexion to 90
- If patient can lift 3 lbs on 4 way SLR- progress to hip strengthening on the cable column or multi-hip machine
- Can begin aquatic exercise for open chain hip flexion/abduction/adduction/ extension
- If patient having difficulty maintaining full extension, begin prone leg hang

Week 6 Post-op

- Active SAQ if no pain in patellofemoral joint, no pain in area of VMO and no tibial tuberosity pain and no crepitus or increased swelling
- Begin gentle submaximal Multi-angle (MAI) quadriceps isometric exercise if pain-free in PF joint, no VMO pain, no tibial tuberosity pain and no crepitus
- As directed by physician, patient may begin 50-75% WB with 2 crutches with heel toe gait pattern
- Aquatic Exercise (if available)-forward walking, lateral walking, knee flexion, heel raises
- Bridging on the table or floor
- As directed by MD, continue AA Knee Flexion and progress beyond 90 as tolerated
- If patient does not have at least 90 degrees knee flexion, begin gentle passive stretching to regain flexion
- Seated heel raise
- Standing bilateral heel raise
- Weight shift-laterally, diagonally and forward
- Closed chain terminal knee extension in standing with theraband behind knee

II. Phase II: Transition Phase (weeks 6-12)

Criteria to progress to Transition Phase

- Full passive knee extension
- Knee Flexion to 90 degrees
- Minimal pain and swelling

Phase II: Transition Phase Goals:

- Gradually increase to full ROM and WB
- Gradually improve quadriceps strength/endurance
- Gradual increase in functional activities

Brace

- Discontinue post-op knee brace or knee immobilizer at 6 weeks (if applicable)
- May consider a patellar stabilization type brace (J brace or equivalent)

WB Status

- Progress WB as tolerated (Physician Direction)
 - 50-75% at 6 weeks, 75-100% at 7 weeks and progress to full WB at 8-10 weeks
 - Discontinue crutches at 8-10 weeks when patient has good quad control and can walk with a normal gait pattern and no limp and no complaints of pain

ROM:

- Gradual increase in ROM
- Maintain full passive knee extension
- Progress knee flexion to 125-135 degrees by weeks 8-10
- Continue patellar mobilization and soft tissue mobilization, as needed
- Continue stretching program

Strengthening Exercises:

- Initiate weight shifts at 6-8 weeks post-op
- Leg press (0-30-45 degrees) can begin at 8-10 weeks post-op as long as pain-free and no crepitus or increased swelling as tolerated. Begin with bilateral leg press and gradually progress to unilateral as tolerated
- Wall slides or mini-squats 0-30 degrees can begin at 10 weeks post-op as long as pain-free and no crepitus or increased swelling
- Progress SAQ resistance at 8 weeks post-op progressing 1 lb. increments as tolerated
- Stationary bike (gradually increase time)
- Balance and proprioception drills
- Continue use of electrical stimulation and biofeedback as needed
- Continue use of pool for gait training and exercise

Functional Activities

- As pain and swelling diminish, the patient may gradually increase functional activities
- Gradually increase standing and walking

Week 7 Post-op

- Progress ambulation to 1 crutch or cane and 75-100% WB with normal gait pattern
- Standing gastroc and soleus stretch
- Physioball two leg bridge
- Bike: if ROM allows, low resistance

Week 8 Post-op

- Progress to ambulation without any assistive device if patient is able to walk with normal gait pattern
- Cone walk-forward and laterally
- One leg standing balance
- Begin adding resistance for SAQ's in pain-free ROM and progress as tolerated
- Leg Press Machine (2 legged) begin at 0-30 degrees and then progress to 0-45 degrees as tolerated as long as no pain, crepitus or increased swelling
- Total Gym Leg Press if available in safe pain-free ROM

Week 9 Post-op

- One leg balance-Airex
- BOSU forward/back and side to side

Week 10 Post-op

- One leg heel raise
- Begin physioball wall squats or wall slides 0-30 degrees and then progress to 0-45 degrees as tolerated
- Leg Press Machine (2 legged) progress to 0-60 degrees as tolerated as long as no pain, crepitus or increased swelling
- Begin Leg Press-(one legged) from 0-30 degrees and progressing to 0-45 degrees as tolerated
- Progress SAQ resistance as tolerated as long as no pain, crepitus or increased swelling
- Treadmill walking to increase endurance and cadence
- Elliptical machine to increase endurance

Week 11 Post-op

- BOSU mini-squats (0-45 degrees)
- Physioball wall squats or wall squats 0-60 degrees
- Physioball one leg bridge
- Physioball two leg leg curl for hamstrings

Week 12 Post-op

- Front Step-ups (begin at 2" and then progress to 4", 6" and 8" as long as pain-free)
- Lateral step-ups (begin at 2" and then progress to 4", 6" and 8" as long as pain-free)
- Step down (begin at 2" and then progress to 4", 6" and 8" as long as pain-free)
- Begin hamstring curl machine
- Quadriceps stretch in sidelying or prone
- Lateral shuffle with band
- Monster walk with band
- Physioball one leg leg curl for hamstring

III. Phase III: Remodeling Phase (weeks 12-26)

Criteria to progress to Remodeling phase

- Full ROM
- Acceptable strength level
- Hamstrings within 20% of contralateral extremity
- Quadriceps within 30% of contralateral extremity
- Balance testing within 30% of contralateral extremity
- Able to bike for 30 minutes

Goals:

- Improve muscular strength and endurance
- Increase functional activities

ROM:

- Patient should exhibit 0-135 degrees flexion

Strengthening and Endurance Exercise Program:

- Continue progressing exercises
- Leg Press 0-60 degrees
- Bilateral squats (0-60 degrees)
- Unilateral step-ups (2-4-6-8 inches)
- Forward lunges (limited range) if no pain, crepitus or increased swelling
- Progress walking program on the treadmill
- Bicycle
- Swimming (no whip kick or butterfly stroke)
- Elliptical

Functional Activities

- Increase walking (distance, cadence, incline, etc.)

4 month Post-op

- Airex box drill with band for 4 way hip
- Cone reach with knee straight
- Cone reach with knee bent slightly
- May consider forward lunge (limited range of motion) if no history of PF crepitus and no increase in pain or swelling with lunge

Criteria to Start Running/Agility Program

- MMT at least 5/5, ROM equal to uninvolved side or at least 0-125
- Normal gait pattern at least 20 minutes without symptoms
- Leg Press test within 75-80% of contralateral LE
- Hamstring and quadricep strength 70 % of the involved side isokinetically
- Lateral step test within 75-80% of contralateral LE
- No pain, crepitus, edema or giving way
- Clearance from MD

5-12 Months Post-op

- Lateral shuffle/Carioca
- Agility Ladder
- Sport Cord Jogging
- Reduced Impact Treadmill Jogging or Aquatic Jogging and Water Aerobics

IV. Phase IV: Maturation Phase (weeks 26-52)

Criteria to Progress to Phase IV Maturation Phase

- Full non-painful ROM
- Strength within 80-90% of contralateral extremity
- Balance and/or stability within 75-80% of contralateral extremity
- No pain, inflammation or swelling

Phase IV Maturation Phase Goals:

- Gradual return to full unrestricted functional activities

Phase IV: Maturation Phase (weeks 26-52) Exercises:

- Continue maintenance program progression 3-4 times per week
- Progress resistance as tolerated
- Emphasis on entire lower extremity strength and flexibility
- Progress agility and balance drills
- Impact loading program should be individualized to the patient's needs
- Progress sport programs depending on patient variables

Criteria to Return to Sports

- Completion of running and agility program without symptoms with good form
- Quadriceps strength 85-90 %
- Hamstring strength 85-90 %
- Good balance and proprioception