

Post-operative Rehabilitation Protocol Medial Patellofemoral Ligament (MPFL) Reconstruction WITH TTO

PHASE I: PROTECTION PHASE (WEEKS 0-6)

- **GOALS:**
 - Independence in home therapeutic exercise (HEP) program
 - Promote healing
 - Control post-operative pain / swelling
 - Prevent quadriceps inhibition: fair to good quadriceps contraction
 - Straight leg raise (SLR) without lag, pain-free
 - ROM: 0° KE to ≥ 90° KF
- **PRECAUTIONS:**
 - Avoid ambulation without brace for first 6 weeks, avoid full weight bearing for first 6 weeks
 - Avoid lateralization of patella
 - Avoid AA-AROM KE, especially with significant quad atrophy, and articular cartilage injury
 - Avoid symptom provocation: it leads to quadriceps shut down, joint effusion, active inflammation
 - Follow KF ROM as per surgeon's guidelines
- **TREATMENT RECOMMENDATIONS:**
 - Emphasize patient compliance to HEP and weight bearing precautions/ progression
 - 50% WB for first 6 weeks
 - ROM 0 – 70 for first 2 weeks, 0 – 90 for weeks 2-4, brace unlocked weeks 4-6
 - Cryotherapy
 - Work on motion right away!
 - Quadriceps re-education: quadriceps sets with towel roll under knee
 - Sitting knee ROM exercise: AAROM KF, PROM KE
 - Quad set with towel roll under knee
 - Hip progressive resisted exercises: pain-free SLR with brace if lag is present
 - Distal strengthening (PF)
 - Flexibility exercises (hamstrings, gastrocnemius)

MINIMUM CRITERIA FOR ADVANCEMENT TO NEXT PHASE:

- Fair to good quadriceps contraction
- Good patellar mobility in medial direction
- ROM: 0° knee extension to ≥90° knee flexion
- 0/10 pain at rest
- Able to SLR pain-free without quadriceps lag

PHASE II: GAIT PHASE (WEEKS 7-10)

- GOALS:
 - Independence in HEP, as instructed
 - Control pain, inflammation, effusion
 - Promote healing
 - ROM 0° KE – 110° KF (8 weeks), 120° (10 weeks) to full ROM
 - Good patella mobility
 - Good quad contraction
 - Normalize gait
 - Postural stability, alignment and N-M control in single limb stance
 - 0/10 pain with ADLs, therapeutic exercise: Recognize pain-free arc of motion
- PRECAUTIONS:
 - Sign and symptom provocation: pain, inflammation, quadriceps shut down, joint effusion
 - Concomitant procedures: TTO, articular cartilage procedure
 - Lateralization of the patella
 - Pathological gait pattern (quadriceps avoidance; bent knee)
 - Arc of motion during exercise
- TREATMENT RECOMMENDATIONS:
 - HEP: advance as tolerated. Continue phase I exercises, as appropriate
 - Patient education: Activity modification, progression of gait training, cryotherapy
 - Patellar mobilization
 - ROM exercises:
 - Sitting PROM to AAROM KE in a pain-free arc of motion (no cartilage injury) to AAROM KF
 - KF: sitting progressing to stair ROM, supine wall ROM as tolerated (~125° KF in sitting, quad control)
 - Gait training: heel toe gait pattern [with adequate quad control (SLR without a lag, ability to achieve terminal knee extension) and knee ROM] to ensure normal loading response; hydro-treadmill (adequate wound healing) or anti-gravity treadmill. Low grade elevation or retro-walking to encourage N-M control with KF during loading response
 - Quadriceps strengthening: progress pain-free arc of motion, close chain preferred
 - Quad sets, submaximal multi angle isometrics, Estim, biofeedback, as needed

- Leg press: monitor arc of motion (bilateral, eccentric)
- Initiate forward step up (FSU) progression, 6” step with adequate strength
- Bicycle: progressing from short crank to standard crank as ROM allows (115° KF in sitting), 80 RPMs
- Flexibility exercises - evaluation-based: AROM KF with hip extension in standing
- Advance proximal strength and core training: (i.e. hip extension with knee flexion, side planks, bridge)
- Hydrotherapy for gait, single limb alignment and stability, proximal strengthening
- Initiate balance and proprioceptive training: double limb support on progressively challenging surfaces to single limb support on level surface only with demonstration of good alignment, stability and N-M control

MINIMUM CRITERIA FOR ADVANCEMENT:

- ROM 0° KE – > 115° KF
- Normal gait pattern
- Good patella mobility
- Postural stability, alignment and N-M control in single limb stance
- 0/10 pain with ADLs and therapeutic exercise
- Independent HEP

PHASE III: STRENGTHENING (WEEKS 11-18+)

- GOALS:
 - Independent HEP
 - Control pain, effusion and inflammation
 - 0/10 pain with ADLs, therapeutic exercise
 - ROM: WNLs, 130° (12 weeks)
 - Normalize gait on level surfaces and stairs
 - Address imbalances
 - Good single limb dynamic balance
 - Eccentric quadriceps and pelvic control with 6”/ 8” FSD
 - Initiate running program, plyometrics (bilateral)
 - Symmetry, quality, alignment during selected movement patterns: squat, jump in place
- PRECAUTIONS:
 - Sign and symptom provocation: pain, and active inflammation/ effusion, quadriceps shutdown
 - Gait deviations
 - “Too much, too soon” progression
- TREATMENT RECOMMENDATIONS:
 - HEP, as instructed
 - Educate patient: Activity modification, individualized, and cryotherapy

- Quadriceps strengthening: progress as tolerated, monitor arc of motion, closed chain preferred
 - FSU progression: 6” step progressing to 8” step (dependent on patient height)
 - Eccentric leg press progressing to:
 - Forward step down (FSD) progression: 6” step progressing to 8” step (dependent on patient height)
 - Squat progression: chair squats, (use ball if necessary), to free squats
- ROM exercises:
 - (AA) ROM KE (monitor arc of motion) to AAROM KF in sitting to supine wall slides to stair stretch
- Gait training to emphasize heel-toe gait pattern with emphasis on loading response
- Advance proximal strength through functional activities (bridging progression, hip extension with KF, clock, RDL, windmill, lawn mower) and core training (planks, side planks, Sahrman progression)
- Balance progression with postural alignment and N-M control (static to dynamic, introduce different planes of motion, challenging surfaces)
- Address muscle imbalances – evaluation-based: (i.e. 2 joint hip flexor length)
- Cross training: elliptical trainer initiated with good strength/ quality during 6” FSU, bicycle (80 RPMs), swimming (crawl, back stroke)
- Initiate running program (late phase): with eccentric quadriceps control during 8” FSD and MD clearance
 - 30 second interval initially
- Initiate plyometric program with MD clearance and evidence of good eccentric quadriceps control
 - Vertical jumping progression: Jump up to jump in place

CRITERIA FOR ADVANCEMENT:

- *No pain or swelling, normal ROM*
- *Normalize gait*
- *Ability to demonstrate alignment, control, stability in single limb stance during dynamic activities*
- *Core stability: Single leg bridge = 30 s, Sahrman ≥ level 3*
- *Able to ascend 6”/ 8” step with good control*
- *Able to descend 6”/ 8” step with good control, and alignment*
- *Symmetry, quality, alignment during selected movement patterns*
- *Independence in a home exercise program*

PHASE IV: ADVANCED STRENGTHENING AND FUNCTION (WEEKS 19-24)

- **GOALS:**
 - Lack of pain, apprehension with sport specific movements
 - Maximize strength and flexibility as to meet demands of individual's sport activity
 - Ability to demonstrate strategy, symmetry, quality, control and alignment during selected movement patterns: squat, jump (vertical and horizontal), single leg squat
 - Isokinetic test: 180° / sec and 300° / sec 85% limb symmetry index (LSI) Cardiovascular fitness to meet demands of sport
- **PRECAUTIONS:**
 - Pain with therapeutic exercise & functional activities
 - Inadequate strength, functional strength, ROM, flexibility, fitness when returning to sport
- **TREATMENT RECOMMENDATIONS:**
 - Continue to advance LE strengthening, flexibility, dynamic single limb stability & agility programs
 - Continue to address muscle imbalances – evaluation-based
 - Advance core stability
 - Cross training
 - Advance plyometric program with MD clearance and evidence of good eccentric quadriceps control
 - Vertical jumping progression: Jump down
 - Horizontal jumping progression: Broad jump, single leg landings
 - Progress running program
 - Cutting, deceleration, change of direction with MD clearance and dynamic single limb stability

CRITERIA FOR DISCHARGE/ RETURN TO SPORT:

- *Isokinetic test at 180°/ sec and 300°/ sec: 85% limb symmetry index (LSI)*
- *Demonstrate symmetry, quality, alignment during selected movement patterns*
- *Medical clearance by surgeon for return to play progression*
- *Lack of apprehension with sport specific movements*
- *Hop Test > 85% limb symmetry*
- *Demonstrate quality of movement with required sports specific activities*