



MPFL Reconstruction Rehabilitation Guideline

This rehabilitation program is designed to return the individual to their activities as quickly and safely as possible. It is designed for rehabilitation following medial patellofemoral ligament (MPFL) reconstruction. Modifications to this guideline may be necessary depending on physician-specific instruction, concomitant injuries or procedures performed. This evidence-based MPFL reconstruction rehabilitation protocol is criterion-based. Time frames and visits in each phase will vary depending on many factors, including patient demographics, goals and individual progress. This guideline is designed to progress the individual through rehabilitation to full sport and activity participation. The therapist may modify the program appropriately depending on the individual's goals for activity following MPFL reconstruction.

This guideline is intended to provide the treating clinician with a frame of reference for rehabilitation. It is not intended to substitute clinical judgment regarding the patient's post-operative care based on exam or treatment findings, individual progress and/or the presence of concomitant procedures or post-operative complications. If the clinician should have questions regarding post-operative progression, they should contact the referring physician.

General Guidelines/Precautions:

- Therapist will monitor pain and swelling and adjust program appropriately.
- Weight bearing will begin immediately in brace locked in full extension unless restricted by concomitant procedure.
- Blood Flow Restriction training is very beneficial early in the recovery process in this population. Please see Blood Flow Restriction guideline for further information.
- Early emphasis is on restoring full ROM (within 12 weeks) and improving quad and gluteal strength while preventing stress to the healing tissue (preventing hip internal rotation and knee valgus stress).
- No impact activities until full ROM, no swelling, adequate healing and strength, proper biomechanics are demonstrated through appropriate functional progression (minimum of 12 weeks).
- Progression to running program at 12-16 weeks based on physician preference, when able to demonstrate sufficient symmetry and shock absorption with running mechanics and level 1 testing activities.
- Level 1 testing (see appendix) considered at 16 weeks post-op with physician clearance.
- Level 2 testing (see appendix) at 6-7 months post-op.
- Return to full sport activities when able to complete level 2 testing at game speed with sufficient biomechanics (45/50 score), confidence in limb and/or release by physician.
- If applicable, level 1 and level 2 testing for isometric quadriceps strength should be completed at 90 degrees of knee flexion. If >70% limb symmetry index isokinetic evaluation can be performed limiting the range of motion from 90-30 degrees of knee flexion.

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PHASE	SUGGESTED INTERVENTIONS	GOALS/MILESTONES FOR PROGRESSION
<p>Phase I <i>Patient Education Phase</i></p>	<p>Discuss: Anatomy, existing pathology, post-op rehab schedule, bracing, and expected progressions</p> <p>Immediate Post-Operative instructions:</p> <ul style="list-style-type: none"> • Weight bearing in brace only, locked in full extension • HEP as instructed by physician post operatively • Care of incision sites 	<p>Goals of Phase:</p> <ol style="list-style-type: none"> 1. Understand surgical procedure and immediate post-operative restrictions.
<p>Phase II <i>Protected Motion Phase</i></p> <p>Weeks 0-6</p> <p>Expected visits: 6-12</p>	<p>Specific Instructions:</p> <ul style="list-style-type: none"> • Knee flexion 0-90 for passive and active range of motion • Weight bearing in locked brace (full extension) • Formal therapy begins • Continue weight bearing in locked brace (full extension) • No biking <p>Suggested Treatments:</p> <p>Modalities Indicated: Edema controlling treatments, compression (donut) pad for edema control</p> <p>Manual Therapy: Patella mobilizations in superior, inferior, medial directions</p> <p>Exercise Examples:</p> <ul style="list-style-type: none"> • Submaximal (pain-free) isometric knee extension (multi-angle) with NMES • Prone hamstring curls in available ROM (0-40 degrees) • SLR in sagittal and frontal planes, can also start in standing or reclined position with NMES • Clamshells • Standing heel raises • Single leg proprioception training in locked brace • Mat based trunk stabilization program for core strength (no planks) 	<p>Goals of Phase:</p> <ol style="list-style-type: none"> 1. Provide environment of proper healing of repair site 2. Prevention of post-operative complications 3. Prevention of contractures through gentle protected motion (symmetrical hyper-extension to 90 degrees flexion) 4. Reduction of post-operative swelling and inflammation (no to trace effusion) 5. Re-education and initiation of quad control with active SLR without extension lag 6. Improved proximal strength (core and gluteal strength 4-/5 or greater) <p>Criteria to Advance to Next Phase:</p> <ol style="list-style-type: none"> 1. Independent straight leg raise with no pain 2. Full hyperextension (compared bilaterally) to 90 degrees of flexion 3. Trace swelling 4. No pain

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<p>Phase III Muscle Activation Phase</p> <p>Weeks 6-12</p> <p>Expected visits: 9-21</p>	<p>Specific Instructions:</p> <ul style="list-style-type: none"> Weight Bearing: WBAT with brace unlocked as quad control allows <p>Suggested Treatments:</p> <p>Modalities: NMES as needed</p> <p>ROM: Progression of ROM program – (Bike for ROM only)</p> <p>Exercise Examples:</p> <ul style="list-style-type: none"> Walking program, bike Continue previous hip and quad strengthening exercises Progression of ROM program (ROM on bike as appropriate with bracing) Open chain knee extension (SAQ 0-60 degrees). Avoid anterior knee pain. Bridge progression for hamstring and gluteals Static proprioception training (double to single leg) with perturbation and variable surfaces (airex pads, air discs, etc) with emphasis on preventing/controlling rotary stress at knee. Closed chain quad strengthening (0-60 degrees) avoiding rotation stress at knee. Includes: <ul style="list-style-type: none"> Forward step ups Weighted leg press Mini-squats (>45° double leg, single or staggered squats <45°) Rear foot elevated split squat Reverse or lateral eccentric step own Plank progression for core strength and stabilization 	<p>Goals of Phase:</p> <ol style="list-style-type: none"> Restoration of full pain-free PROM/AROM Improve muscular strength and endurance Control of forces on extensor mechanism Normalized level ground ambulation Proper application and fit of patella stabilization bracing) Normalized single leg static balance with proper proximal control (no valgus and hip medial rotation) <p>Criteria to Advance to Next Phase:</p> <ol style="list-style-type: none"> Full ROM Normal walking with functional brace 8” lateral step down with good control
<p>Phase IV Advanced Strengthening and Eccentric Control Phase</p> <p>Weeks 12-16</p> <p>Expected visits: 22-30</p>	<p>Specific Instructions:</p> <ul style="list-style-type: none"> Continue previous exercises <p>Suggested Treatments:</p> <p>ROM: Progression of closed and open chain quad strengthening (0-90 degrees)</p> <p>Exercise Examples:</p> <ul style="list-style-type: none"> Progression of closed and open chain quad strengthening (0-90 degrees) <ul style="list-style-type: none"> Squat progressions Lateral dips Forward/lateral step downs Multi-plane lunges Progression to single leg strength training as strength and control allows. Non-impact cardiovascular training <ul style="list-style-type: none"> Elliptical Stairmaster Treadmill walking Aquatic running/agilities 	<p>Goals of Phase:</p> <ol style="list-style-type: none"> Normal Pain-free ADL's without incidents of patella instability Improved quad strength (80% of contralateral limb) Normalized hip and hamstring strength Proper biomechanics and control with forward step down Improved single leg proprioception (80% or greater on anterior and posterior lateral reach of Y Balance test) <p>Criteria to Advance to Next Phase:</p> <ol style="list-style-type: none"> Quad strength 80% of the opposite limb on isometrics testing with hand held dynamometry or Biodex. Y balance within 80% of opposite limb Comparable and adequate hip and hamstring strength compared bilaterally

<p>Phase V Advanced Movement and Impact Phase</p> <p>Months 4-7</p> <p>Expected Visits: 30-34</p>	<p>Specific Instructions:</p> <ul style="list-style-type: none"> • Progression to running program (with appropriate bracing) with training to improve/normalize form and shock absorption (as cleared by MD) • Progression of open and closed chain strengthening for the entire LE chain with emphasis on single limb strengthening • Progression of strengthening program to include multiple plane movements as control allows • Progression of sport specific functional skills as control and pain allow including: <ul style="list-style-type: none"> • Lateral shuffling • Drop jumping • Deceleration • Hopping • Cutting <p>Exercise Examples:</p> <ul style="list-style-type: none"> • Initiating double limb jump training (around 4 months) • Initiate deceleration and single leg hopping (around 5 months) • Initiate cutting activities (around 5 months) • Initiate agility (floor ladder and cone drills) and sport specific activities (around 5 months) 	<p>Suggested Criteria for Discharge:</p> <ol style="list-style-type: none"> 1. <10% strength deficit in quads and gluteals 2. Functional hop tests and Y balance tests at least 90% of contralateral limb. 3. 45/50 on Biomechanical functional assessment tests 4. No pain or complaints of instability with functional progression of sport specific skills 5. Progress to isokinetics around 6 months
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REFERENCES:

1. Platt BN, Bowers LC, Magnuson JA, Marx SM, Liu JN, Farr J, Stone AV. Return to Sport After Medial Patellofemoral Ligament Reconstruction: A Systematic Review and Meta-analysis. Am J Sports Med. 2022 Jan;50(1):282-291. doi: 10.1177/0363546521990004. Epub 2021 Mar 15. PMID: 33720789.
2. Cohen, D., Le, N., Zakharia, A. et al. MPFL reconstruction results in lower redislocation rates and higher functional outcomes than rehabilitation: a systematic review and meta-analysis. Knee Surg Sports Traumatol Arthrosc 30, 3784–3795 (2022). <https://doi.org/10.1007/s00167-022-07003-5>
3. Koshino, Y., Taniguchi, S., Kobayashi, T. et al. Protocols of rehabilitation and return to sport, and clinical outcomes after medial patellofemoral ligament reconstruction with and without tibial tuberosity osteotomy: a systematic review. International Orthopaedics (SICOT) 46, 2517–2528 (2022). <https://doi.org/10.1007/s00264-022-05480-4>
4. Cheatham S, Kolber MJ, Hanney WJ. Rehabilitation of a 23 year old male after right knee arthroscopy and open reconstruction of the medial patellofemoral ligament with a tibialis anterior allograft: a case report. Int J Sports Phys Ther. 2014 Apr;9(2):208-221.
1. Escamilla RF, Zheng N, MacLeod TD, et al. Patellofemoral joint force and stress between a short- and long-step forward lunge. J Orthop Sports Phys Ther. 2008 Nov;38(11):681-690.
2. Vitale TE, Mooney B, Vitale A, Apergis D, Wirth S, Grossman MG. Physical therapy intervention for medial patellofemoral ligament reconstruction after repeated lateral patellar subluxation/dislocation. Int J Sports Phys Ther. 2016 Jun;11(3):423-435.
3. Powers CM, Ho K, Chen Y, Souza RB, Farrokhi S. Patellofemoral joint stress during weight-bearing and non-weight-bearing quadriceps exercises. J Orthop Sports Phys Ther. 2014 May;44(5):320-327.
4. Davis IS, Powers CM. Patellofemoral pain syndrome: proximal, distal, and local factors, an international research retreat. J Orthop Sports Phys Ther. 2010 Mar;40(3):A1-A48.
5. Chinkulprasert C, Vachalathiti R, Powers CM. Patellofemoral joint forces and stress during forward step-up, lateral step-up, and forward step-down exercises. J Orthop Sports Phys Ther. 2011 Apr;41(4):241-248.
6. Hofmann, CL, Holyoak DT, Juris PM. Research report: trunk and shank position influences patellofemoral joint stress of the lead and trail limb during the forward lunge exercise. J Orthop Sports Phys Ther. 2016 Nov;46(11) online ahead of print.

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