

YOUR MPFL RECONSTRUCTION RECOVERY

A GUIDE TO PHYSICAL THERAPY

THE ROLE OF PHYSICAL THERAPY IN YOUR RECOVERY

The MPFL is the primary soft tissue that holds your kneecap from slipping sideways. Your reconstruction restores this restraint using a soft tissue graft. Unlike osteotomy procedures, you can put full weight on your leg from Day 1. Getting your quad and VMO (inner quad) firing early is the most important thing — the VMO is the primary dynamic stabilizer of the kneecap and complements your new MPFL graft. Return to sport is typically at five to six months.

Important: Avoid valgus stress at the knee throughout all phases. Hip strengthening is essential — weak hips allow the knee to collapse inward, which is the same force that caused your dislocation.

YOUR RECOVERY TIMELINE

PHASE	TIMEFRAME	PT VISITS	WHAT YOU'RE WORKING ON
1	Weeks 1–6	2–3× per week	• Full weight-bearing from Day 1 — axial load does not stress the graft • Hinged brace for walking to protect against valgus × 6 weeks • Quad and VMO activation — electrical stimulation if quad is inhibited • Hip abductor and external rotator strengthening begins immediately
2	Weeks 6–12	2× per week	• Brace discontinued once gait is confident and stable • Step-ups, leg press, stationary bike for progressive strength • Single-leg balance and proprioceptive training • Continue hip strengthening to prevent dynamic knee valgus
3	Months 3–5	1× per week + home program	• Progressive strengthening — functional squats, jogging program • Agility and direction-change drills when strength allows • Limb symmetry testing at Month 3 • Sport-specific preparation
4	Months 5–6	Weekly as needed	• Full sport-specific training — cutting, jumping, lateral movement • Final hop and strength testing • Return to sport at 5–6 months when all criteria are met • Clearance by Dr. Merritt

Questions about your PT progress? Call our office or bring them to your next appointment. We are always glad to coordinate with your therapist.

MPFL RECONSTRUCTION — PHYSICAL THERAPY PROTOCOL

Patient Name: _____
Date of Surgery: _____

Surgeon: Andrew L. Merritt, MD
PT Start Date: _____

Overview & General Principles

The MPFL is the primary passive restraint to lateral patellar displacement, contributing approximately 50-60% of the medial stabilizing force to the patella. Reconstruction restores this constraint using a soft-tissue graft (gracilis, semitendinosus, or allograft) anchored at the medial patella and the medial femoral epicondyle. Rehabilitation emphasizes early weight bearing and motion, rapid quadriceps and VMO activation, and systematic proprioceptive retraining. Full return to sport is expected at 5-6 months when progression criteria are met.

- Weight-bearing as tolerated (WBAT) from Day 1. Axial loading without valgus does not stress the MPFL reconstruction. Early WB accelerates quad recovery and proprioceptive retraining.
- Range of motion as tolerated from Day 1. Stiffness is a primary complication of MPFL reconstruction. Early motion prevents contracture and maintains articular cartilage nutrition. There are no flexion restrictions.
- Brace is for ambulation protection only — not ROM restriction. A hinged knee brace is worn during walking for the first 6 weeks to protect against valgus stress. The brace does not limit ROM during exercises or at rest.
- Quadriceps activation is the top early priority. Arthrogenic muscle inhibition (AMI) is common post-operatively. Aggressive early quad activation — using NMES if needed — is critical to achieving brace independence and safe functional progression.
- VMO (vastus medialis obliquus) emphasis throughout all phases. VMO fibers are anatomically continuous with the medial retinaculum and are the primary dynamic stabilizer of patellar tracking. VMO strengthening complements the passive MPFL reconstruction.
- BFR (blood flow restriction training) is approved for all lower extremity strengthening exercises when available. BFR is particularly valuable in early phases for quad and hip strengthening without high joint forces.
- Avoid valgus stress at the knee throughout all phases. Hip abductor and external rotator strengthening is included in every phase to prevent dynamic knee valgus during functional activities.
- Graft type (gracilis autograft, semitendinosus autograft, or allograft) does not alter rehabilitation progression. Evidence shows equivalent outcomes across graft types; timelines and milestones are the same for all.

CONCOMITANT PROCEDURE MODIFICATIONS

Lateral Retinacular Lengthening –

- This is a standard part of MPFL Reconstruction to rebalance the proximal alignment and prevent lateral tilt. This does not change the rehabilitation protocol.

PHASE (Weeks 0-6)

INFORMATION FOR THE PATIENT — What to Expect This Phase

Right after surgery, you can walk with your full weight, but wear your brace anytime you are on your feet for the first 6 weeks. The brace protects the new ligament from sideways forces — it does not restrict how your knee bends. Your main job in Phase 1 is waking up your quad muscle and getting your knee moving.

Goals:

- Achieve WBAT with good quad control; wean from crutches by Week 2-3
- Restore ROM to 0-120 degrees by Week 6
- Establish volitional quad activation: 20 consecutive SLR without extension lag
- Activate VMO with biofeedback or NMES as needed
- Control post-operative pain and effusion
- Maintain patellar mobility (superior/inferior/medial glides only)

Weight-Bearing Status:

WBAT from Day 1 with hinged brace locked in full extension during ambulation. Progress from bilateral crutches to single crutch to no crutches as quad control improves. Most patients transition off crutches by Week 2-3.

Bracing:

Hinged knee brace worn during all ambulation for Weeks 0-6. Brace protects against valgus stress — it does not restrict ROM. Exercises and rest performed without ROM restriction. Begin weaning brace at Week 6 as quad control is confirmed.

Exercises:

- Quad sets (isometric): 3 x 15 reps, 5-second hold, 3-4x/day starting Day 1; add NMES over quad belly if volitional activation is absent
- Straight leg raises (SLR), supine: 3 x 15 reps — begin when quad set is present; goal 20 consecutive reps without extension lag by Week 4-6
- VMO isometric adduction: supine pillow squeezes between knees, 3 x 15 reps; palpate or use biofeedback to confirm VMO activation
- Heel slides (supine, pain-limited): 3 x 15 reps — primary early ROM exercise
- Short-arc quads (0-30 degrees, towel roll under knee): 3 x 15 reps — begin Week 2-3
- Ankle pumps: 2 x 20 reps for circulation
- Glute sets (isometric): 3 x 15 reps
- Hip abduction (supine, operative leg): 3 x 15 reps — begin Week 2
- Patellar mobilization (therapist-performed): superior, inferior, and medial glides only — 1-2 minutes per direction per session; NO lateral glides until Week 4
- Cold compression: 15-20 minutes post-session throughout Phase 1

Progression Milestones:

- 20 consecutive SLR without extension lag
- Active knee ROM 0-120 degrees
- WBAT without crutches on level surfaces
- Effusion trace or absent at rest
- Mini-squat to 30 degrees without pain or valgus

PRECAUTIONS — Phase 1

- NO lateral patellar glides or lateral mobilization through Week 4 — the MPFL graft is anchored to the medial patella; lateral glide forces directly tension the reconstruction during the early healing period.

- Avoid valgus stress during all weight-bearing activities — hip adduction combined with internal rotation creates a valgus moment that loads the reconstructed MPFL. Reinforce neutral lower extremity alignment from Day 1.
- Do not force or aggressively stretch knee flexion — ROM as tolerated means pain-guided motion. Excessive aggressive flexion mobilization can increase effusion, worsen AML, and delay quad recovery.
- If extension lag persists beyond Week 4, add prone knee extension stretching and increase NMES intensity. Extension lag at Phase 1 discharge indicates quad inhibition that must be resolved before progressing.

Rationale: Graft healing in the first 6 weeks follows sequential biology: initial fibrous ingrowth at the bone anchors (Weeks 0-4) followed by early collagen maturation (Weeks 4-8). The graft is at mechanical risk from lateral shear forces during this window. Axial compressive loads (weight bearing) are well tolerated; lateral or valgus forces are not.

PHASE (Weeks 6-12)

INFORMATION FOR THE PATIENT — What to Expect This Phase

By this phase your brace comes off and you start loading the knee more seriously. You will work on squatting, stepping, and building the quad strength needed to protect your patella during movement. You may notice your quad is noticeably weaker than the other side — this is normal and improves quickly with consistent training.

Goals:

- Full active ROM (0-140 degrees+) symmetrical with the contralateral side
- Progress to full weight bearing all environments without brace
- Advance quad and VMO strength — target LSI 70% before Phase 3
- Initiate closed kinetic chain (CKC) strengthening to 45-degree squat depth
- Improve single-leg proprioception on firm surface
- Normalize gait pattern — no antalgic gait, no quad avoidance pattern

Weight-Bearing Status:

Full weight bearing all environments. Brace discontinued by Week 8.

Bracing:

Wean from brace beginning Week 6 — discontinue for indoor level surfaces. May continue for community ambulation or stairs until quad control and confidence are established. Full brace discontinuation by Week 8.

Exercises:

- SLR with progressive ankle weight resistance (1-3 lbs): 3 x 15 reps
- Terminal knee extension (TKE) with resistance band: 3 x 15-20 reps — excellent VMO and terminal quad activation
- Short-arc quads (SAQ) with light resistance: 3 x 15 reps, progress load weekly
- Mini-squats (0-30 degrees): 3 x 15 reps, mirror feedback for valgus correction
- Wall sits (0-45 degrees): 3 x 30-second holds, progress to 60 seconds by Week 12
- Step-ups (4-inch step, operative leg leads): 3 x 12 reps with 10-second hold; progress to 6-inch step by Week 10
- Sit-to-stand: 3 x 10 reps, progress from armrest to no-armrest chair
- Hip abduction side-lying (operative leg): 3 x 15-20 reps; add ankle weight Week 8

- Lateral band walks: 3 x 15 steps/direction — maintain throughout all phases
- Clamshells with resistance band: 3 x 15-20 reps
- Single-leg balance, firm surface: 3 x 30 seconds/leg — begin Week 8
- Patellar mobilization (self-performed, all directions): 1-2 minutes/day

Progression Milestones:

- Full symmetric ROM (0-140 degrees or equal to contralateral)
- Single-leg stance 30 seconds on firm surface without deviation
- Step-ups 15 reps on 6-inch step with 15-second hold, no compensation
- Mini-squat to 45 degrees with neutral knee alignment
- Quad strength LSI 70% (dynamometer or clinical estimate)

PRECAUTIONS — Phase 2

- Do not allow valgus collapse during step-ups or mini-squats — if persistent dynamic valgus is observed despite cueing, increase hip abductor loading before progressing depth or load. The MPFL resists lateral patellar displacement; dynamic valgus increases the lateral force it must resist.
- Avoid aggressive quad stretching in prone if patellar hypersensitivity persists — gentle passive flexion is appropriate, but high-load quad stretching can aggravate patellofemoral irritation before articular gliding mechanics normalize.
- No resisted OKC knee extension (leg extension machine) through Week 12 — patellofemoral joint reactive force is highest in the 0-30-degree range of OKC extension, where force is concentrated on the new graft anchors.
- If significant pain or effusion flares, reduce activity and notify Dr. Merritt if extension lag returns or effusion significantly worsens.

Rationale: Weeks 6-12 represent the early graft incorporation period. The graft has initial tensile strength but is undergoing collagen maturation. CKC exercises are preferred because compressive joint forces improve patellar tracking and are well tolerated; open chain resisted extension concentrates high shear at the patellar anchor sites.

PHASE (Weeks 12-20)

INFORMATION FOR THE PATIENT — What to Expect This Phase

This is the hardest phase — single-leg exercises, early jumping, and the start of running. Your quad needs to be strong enough to protect your patella every time you land or cut. By the end of Phase 3 you should feel stable enough to begin sport-specific training. Push hard, but respect pain: anterior knee pain with loading is a signal to back off and address mechanics.

Goals:

- Single-leg functional strength — full-depth single-leg squat without compensation
- Quad and hamstring LSI 80% minimum; target 90% for Phase 4 clearance
- Introduce and progress bilateral plyometrics
- Dynamic patellar tracking — no valgus on single-leg squat or step-down assessment
- Advanced proprioception on unstable surfaces
- Running mechanics normalized — begin and progress jogging

Weight-Bearing Status:

Full weight bearing. Progressive loading including single-leg and impact.

Bracing:

None required. Patellar taping at PT discretion if tracking correction is needed.

Exercises:

- Single-leg squats (operative leg): 3 x 8-10 reps with mirror or video for valgus; begin Week 14-15; progress to full depth by Week 18
- Bulgarian split squats (rear foot elevated, front leg operative): 3 x 10-12 reps/leg — begin Week 16
- Step-downs (8-inch step, eccentric controlled): 3 x 12-15 reps/leg — excellent VMO eccentric load; begin Week 15
- Lateral step-ups (8-inch step): 3 x 12-15 reps/leg — begin Week 16
- Goblet squats (full depth 0-90 degrees): 3 x 12-15 reps — begin Week 14
- Terminal knee extension (TKE) with resistance progression: 3 x 20 reps maintain
- Nordic hamstring curls (assisted to unassisted eccentric): 3 x 6-10 reps — begin Week 16
- Single-leg glute bridges: 3 x 12 reps/leg — begin Week 14
- Copenhagen adduction (side-lying or partner-assisted): 3 x 15 reps — VMO and adductor synergy; begin Week 14
- Single-leg stance on foam or wobble board: 3 x 30-45 seconds/leg — begin Week 14
- Perturbation training (single-leg, arm perturbations from therapist): 3 x 30 seconds/leg
- Jogging progression: Begin Week 14-16 (prerequisite: pain-free single-leg stance); flat surface only, progress distance and speed weekly
- Double-leg vertical jump, stick landing: 3 x 8 reps — begin Week 16-17; focus on quiet, valgus-free landing
- Lateral bounds (bilateral, controlled deceleration): 3 x 6/direction — Week 17-18
- Box jumps (12-18 inch, step down): 3 x 6 reps — begin Week 18-19

Progression Milestones:

- Single-leg squat to 60 degrees without valgus or trunk deviation, 10 reps
- Step-down test: smooth eccentric control, no dynamic valgus, bilateral symmetry
- Quad LSI 80% (progress to 90% before Phase 4 clearance)
- Single-leg hop for distance LSI 80%
- Jogging 20 minutes continuously on flat surface, pain-free
- Double-leg bilateral plyometrics pain-free with correct mechanics

PRECAUTIONS — Phase 3

- Do not advance to single-leg plyometrics until single-leg squat mechanics are controlled — valgus during loaded landing places the same lateral shear forces on the patella as the original dislocation mechanism. Strength and mechanics must precede reactive training.
- Anterior knee pain with loading (patellofemoral pain syndrome) may develop as loads increase — reduce squat depth, limit step-down range, and address VMO and hip abductor strength before continuing progression. Persistent pain should be communicated to Dr. Merritt.
- Running mechanics must be assessed before advancing jogging volume — look for dynamic valgus, ipsilateral trunk lean, and contralateral pelvic drop, all of which increase patellofemoral load during running.
- OKC resisted knee extension (leg extension machine) is permitted from Week 16 in a limited range (90-40 degrees) only once single-leg CKC strength is established — prioritize CKC throughout.

Rationale: Phase 3 represents the functional remodeling phase of graft maturation. The graft has sufficient mechanical strength for progressive CKC loading, but reactive and single-leg plyometric demands must be introduced in a graduated, criterion-based manner. The neuromuscular system requires progressive retraining before unguarded dynamic movement is safe.

PHASE (Weeks 20-24 (target RTS: 5-6 months))**INFORMATION FOR THE PATIENT — What to Expect This Phase**

The final phase is about sport preparation — cutting, jumping, reacting at full speed. Your knee should feel stable and confident, not just strong. If you feel apprehension or sense instability during drills, tell your PT and Dr. Merritt. Do not push through perceived instability. Clearance is based on objective testing, not time alone.

Goals:

- Quad and hamstring LSI 90% on strength testing
- Single-leg hop tests LSI 90% (single, triple, crossover, 6-meter timed)
- Sport-specific cutting, pivoting, and deceleration at full speed without apprehension
- No anterior knee pain or instability with sport-level activity
- Psychological clearance — athlete confident, fear-free
- Unrestricted return to sport with physician clearance

Weight-Bearing Status:

Full weight bearing. No restrictions.

Bracing:

None required. Patellar stabilization sleeve optional for contact sports at athlete or surgeon preference.

Exercises:

- Single-leg jump-and-stick: 3 x 5-8 reps/leg — full controlled landing hold
- Single-leg lateral hops: 3 x 8 reps/direction — progressive amplitude
- Depth jumps (12-inch box, bilateral then unilateral): 3 x 5-6 reps — Week 22+
- Crossover lateral bounds: 3 x 8 strides/direction
- Full-speed straight-line sprint progression
- 45-degree cut drills at progressive speed: bilateral then reactive (partner cued)
- 90-degree direction-change drills: T-drill, 5-10-5 shuttle at full speed
- Sport-specific movement sequence: acceleration, cut, deceleration, pivot
- Strength maintenance (2-3x/week through season): single-leg squats 3 x 12, lateral band walks 3 x 20, Nordic curls 2 x 10/leg

Progression Milestones:

- Quad LSI 90% on isokinetic or handheld dynamometer at 60 degrees/sec
- Single-leg hop for distance, triple hop, and crossover hop LSI 90%
- 6-meter timed hop LSI 90%
- Y-Balance composite score symmetry 90%
- Full-speed cutting and pivoting — no instability, no apprehension
- Athlete confidence rating 8/10 or higher

PRECAUTIONS — Phase 4

- Minimum 6-month soft-tissue timeline for cutting and pivoting sports — graft ligamentization requires 6-9 months regardless of functional testing performance. Testing confirms readiness; it does not accelerate biology.

- Apprehension with lateral movement or cutting is a disqualifying symptom — return to Phase 3 functional training and reassess mechanics before progressing to reactive drills. Apprehension may reflect inadequate neuromuscular retraining or graft laxity.
- Do not use time alone as a clearance criterion — LSI below 90% at return to sport is associated with significantly higher re-injury rates. Objective testing is required.
- Any episode of lateral patellar subluxation or frank dislocation post-operatively requires immediate notification of Dr. Merritt and suspension of all return-to-sport activity.

Rationale: Patellar re-dislocation rates following MPFL reconstruction range from 0-11% depending on graft type and anatomy. The primary modifiable risk factors are inadequate VMO strength, persistent dynamic valgus, and premature return to cutting and pivoting before neuromuscular control is fully restored.

Surgeon Notes / Special Instructions: