

PHYSICAL THERAPY PROTOCOL

MPFL Reconstruction

Medial Patellofemoral Ligament Reconstruction for Recurrent Patellar Instability

FOR THE PHYSICAL THERAPIST

Overview and Goals

This protocol governs rehabilitation following isolated medial patellofemoral ligament (MPFL) reconstruction for recurrent lateral patellar instability. The MPFL is the primary passive restraint against lateral patellar translation, most active in the first 20–30° of knee flexion before the patella engages the trochlear groove. The reconstructed graft restores this checkrein. Because the MPFL is not axially loaded, weight-bearing is limited by comfort and quadriceps control rather than by graft protection; the graft is instead threatened by **rotational stress and lateral patellar translation** during early healing.

The parameters below follow the most consistent pattern across the published evidence. A structured review of 35 isolated MPFL reconstruction protocols found the majority favor immediate weight-bearing as tolerated (66%), locked bracing for up to 6 weeks (63%), and full ROM by 6–12 weeks (51%).¹ Accelerated rehabilitation without immobilization or weight-bearing restriction has not been shown to increase recurrent dislocation risk or worsen patient-reported outcomes at mid-term follow-up,² so the early weight-bearing posture here is both evidence-based and safe. Quadriceps strengthening — the most frequently cited intervention — begins within the first two weeks.^{3,6}

Two principles guide rehabilitation. First, protect the graft from lateral patellar translation and rotational stress: brace in extension for early ambulation, restore extension first, mobilize the patella superiorly and medially but never laterally, and avoid pivoting, cutting, and lateral patellar stress for the first 12 weeks (graft elongation and incomplete tunnel-graft integration can alter patellofemoral alignment during this window).⁸ Second, restore quadriceps control and full extension early to prevent arthrofibrosis and cyclops-type extension loss, while progressing flexion in a graded fashion.

Progression is criterion-based; the timelines are approximate guidelines. Communicate with Dr. Roth's office regarding intraoperative findings, graft fixation, and any concomitant procedure that alters this protocol. Return to sport averages approximately 6–7 months, with overall return-to-sport rates of 85–93%.^{4,5}

READ BEFORE STARTING — SCOPE & GRAFT-PROTECTION PRECAUTIONS

This protocol applies to **isolated** MPFL reconstruction. Concomitant procedures require more protective weight-bearing and ROM and take precedence:

- If a **tibial tubercle osteotomy (TTO)** was performed, use Dr. Roth's TTO protocol — weight-bearing is restricted for bone healing and return to sport is slower.
- If a **trochleoplasty or cartilage/chondral procedure** was performed, follow the corresponding protocol's weight-bearing and ROM restrictions.

Precautions that apply throughout this protocol:

- No lateral patellar mobilization at any point — it tensions the medial graft. Superior and medial glides only.
- No resisted open-chain knee extension from 45° to full extension for the first 12 weeks (high patellofemoral contact stress).
- No pivoting, cutting, or lateral patellar stress for the first 12 weeks; avoid lateral patellar stress for a minimum of 3 months.

Rehabilitation Phases

PHASE	WEIGHT BEARING	BRACE	ROM GOALS	EXERCISES	CRITERIA TO ADVANCE
PHASE 1 Weeks 0–2 <i>Protection & early mobilization</i>	- Weight-bearing as tolerated with crutches, brace locked in extension.^{1,2} - MPFL is not axially loaded — weight-bearing is limited by comfort and quad control, not graft protection.	- Hinged brace locked in full extension for ambulation and sleep.¹ - Unlock only for ROM exercises.	0–90° (PROM / AAROM), progress as tolerated. Priority: - Restore full extension Patella: - Superior + medial glides only — no lateral glide	Quadriceps activation: - Quad sets (isometric) - Straight-leg raises in all planes — flexion, abduction, adduction, extension (brace locked) - NMES to quadriceps as needed ROM / mobility: - Seated or supine heel slides - Gentle prone/supine passive extension to maintain full extension - Ankle pumps Proximal / adjunct: - Gluteal sets - Cryotherapy for pain and edema	- Quadriceps activation with SLR (minimal or no extensor lag) - Full passive extension restored - ROM ≥ 90° - Pain and effusion controlled - Minimum 2 weeks elapsed
PHASE 2 Weeks 2–6 <i>Progressive ROM & early strengthening</i>	Progress to full weight-bearing without crutches as tolerated, typically by weeks 3–4.	- Continue locked in extension for ambulation. - Begin unlocking for gait as quad control improves (typically wks 3–4). Discontinue by week 6 once SLR without extensor lag is demonstrated.	- Progress toward 0–120° by week 6. Patella: - Continue superior + medial mobs Bike: - Stationary bike when flexion permits (~110°)	Strengthening: - Progress SLR all planes (add ankle weights as tolerated) - Mini-squats / wall slides (0–45°) - Standing calf raises - Closed-chain leg press (0–60°) Hip / core: - Side-lying hip abduction, clamshells - Prone hip extension - Core stabilization Neuromuscular: - Balance / proprioception — bilateral stance on unstable surface	- Full weight-bearing without crutches - Brace discontinued without extensor lag - ROM ≥ 120° - Normalized gait - Minimum 6 weeks elapsed
PHASE 3 Weeks 6–12 <i>Progressive strengthening</i>	Full.	None.	- Achieve full ROM (0–135°+) by weeks 6–12. Stretching: - Hamstrings, quadriceps, ITB, gastroc/soleus	Closed-chain progression: - Squats, leg press, step-ups (forward and lateral), lunges Open-chain (limited arc): - Begin open-chain knee extension in a 90–0/45° arc only — no resisted extension 45° → full Neuromuscular / hip: - Single-leg balance and proprioception drills - Lateral band walks / monster walks - Hip strengthening all planes with progressive resistance Conditioning: - Elliptical, swimming (flutter kick) - Core and trunk stabilization progression	- Full, pain-free ROM - No effusion - SLR without extensor lag - Quadriceps manual muscle test ≥ 4/5 - Minimum 12 weeks elapsed
PHASE 4 Weeks 12–20 <i>Advanced strengthening & functional training</i>	Full.	None.	Full ROM maintained.	Strengthening: - Full-arc open-chain knee extension — progress resistance gradually (now permitted after week 12) - Single-leg squats, single-leg press, single-leg deadlifts	- Quadriceps strength ≥ 80% of contralateral limb (isokinetic or HHD) - No pain or effusion with advanced

PHASE	WEIGHT BEARING	BRACE	ROM GOALS	EXERCISES	CRITERIA TO ADVANCE
				- Continue hip and core strengthening Plyometrics: - Bilateral → unilateral (box jumps, drop jumps, lateral hops) Agility: - Ladder and cone drills (linear → lateral → multidirectional) - Sport-specific movement patterns Conditioning: - Straight-line jogging (typically wk 12–16, when quad strength ≥ 70% of contralateral and no pain/effusion) → interval running	- activities - Single-leg hop ≥ 80% limb symmetry - Minimum 20 weeks elapsed for RTS phase
PHASE 5 Weeks 20–28+ <i>Return to sport</i>	• Full.	• None.	• Full ROM.	Sport-specific progression: - Sport-specific drills at full speed - Non-contact → contact practice → full competition, over ~4–6 weeks Maintenance: - Continue quadriceps and hip strengthening 2–3×/week - Ongoing neuromuscular and proprioceptive training - Monitor for any recurrent instability symptoms	<i>See Return-to-Activity Criteria section below.</i> Return to sport averages ~6–7 months; all criteria below must be met with physician clearance.^{4,5}

Procedure-Specific Considerations

Lateral Patellar Translation Is the Protected Motion

The reconstructed MPFL resists lateral patellar translation. Any force that pulls the patella laterally — lateral patellar glide during mobilization, valgus/rotational stress, pivoting, or cutting — loads the graft directly and can cause elongation before tunnel-graft integration is complete. Patellar mobilization is therefore restricted to superior and medial glides only, and lateral patellar stress is avoided for a minimum of 3 months.⁸ Medial glide is not only safe but useful: it unloads the medial graft and helps restore the medial patellar mobility often lost after surgery. Any new apprehension or a sense of the patella “slipping” during rehabilitation should prompt re-evaluation by Dr. Roth.

Weight-Bearing Is Not Axially Limited

Unlike meniscus or cartilage procedures, MPFL reconstruction does not depend on protecting an axially loaded repair — the graft restrains the patella, not the tibiofemoral joint surface. Immediate weight-bearing as tolerated (with the brace locked in extension for stability and quadriceps protection) is supported by the majority of published protocols and by evidence that accelerated, unrestricted weight-bearing does not increase recurrent instability.^{1,2} Early weight-bearing is limited by comfort, effusion, and quadriceps control — not by graft healing. This is the key point of difference from the knee’s cartilage and meniscal protocols, and it should be reinforced with patients who expect a prolonged non-weight-bearing period.

Extension First — Guard Against Arthrofibrosis

Restoring full passive extension in the first two weeks is the top ROM priority. Loss of extension after MPFL reconstruction can progress to arthrofibrosis or a cyclops-type block that requires further intervention. Flexion is progressed in a graded fashion (0–90° by week 2, 0–120° by week 6, full by weeks 6–12) — deliberately, but without allowing an extension deficit to develop. Any loss of previously achieved extension is a red flag warranting prompt re-evaluation.

Open-Chain Extension Arc Restriction

Resisted open-chain knee extension through the 45°-to-full-extension arc generates high patellofemoral contact and shear stress and is avoided for the first 12 weeks.⁶ Open-chain extension is reintroduced in a protected 90–045° arc during Phase 3, then progressed to full-arc resisted extension only after week 12 in Phase 4. Closed-chain strengthening (squats, leg press, step-ups) is the mainstay of quadriceps loading in the interim, distributing patellofemoral forces more favorably.

Concomitant Procedures Change the Protocol

Return to sport is meaningfully slower and weight-bearing more restricted when MPFL reconstruction is combined with tibial tubercle osteotomy. Isolated MPFL reconstruction returns to sport at approximately 9.5 months in some series, versus ~13 months for MPFL + TTO, with isolated reconstruction also reaching a higher rate of return to the same or higher level of sport.⁶ When a TTO, trochleoplasty, or cartilage procedure was performed, that procedure's protocol governs early weight-bearing and ROM — this isolated-MPFL protocol does not apply. Confirm the operative details before starting.

Return-to-Activity Criteria

Progression is criterion-based, matched to the demands of the target activity. Return to sport averages approximately 6–7 months, with overall return-to-sport rates of 85–93%.^{4,5} Fear of reinjury is the most commonly cited barrier to return, affecting up to 50% of patients who do not return to their prior level — psychological readiness screening (e.g., Tampa Scale of Kinesiophobia) is a meaningful part of clearance.⁷

Activity Tier	Criteria & Timing
Activities of daily living (ADLs)	Full pain-free ROM, quadriceps control without extensor lag, normalized gait off crutches and brace. Typically by weeks 6–8.
Stationary bike / swimming / elliptical	Flexion $\geq 110^\circ$ for the bike; no effusion. Bike typically ~weeks 4–6; elliptical and flutter-kick swimming in Phase 3.
Jogging / running	Quadriceps strength $\geq 70\%$ of contralateral limb, no pain or effusion. Straight-line jogging typically weeks 12–16, progressing to interval running.
Agility, plyometrics, sport-specific drills	Quadriceps strength $\geq 80\%$ of contralateral limb, single-leg hop $\geq 80\%$ limb symmetry, no pain/effusion with advanced activity. Typically Phase 4 (weeks 12–20).
Full return to sport (incl. cutting, pivoting, contact)	Quadriceps strength index $\geq 90\%$ LSI; hop battery $\geq 90\%$ LSI (single, triple, crossover, timed); no pain, effusion, or apprehension; sport-specific agility/plyometric drills complete; psychological readiness; physician clearance. Typically ~6–7 months.

REALISTIC EXPECTATIONS & RECURRENCE

Return-to-sport rates after isolated MPFL reconstruction are high (85–93%), and recurrent dislocation rates are low. Patients should be counseled that reaching their **prior competitive level** is less certain than returning to sport at all — fear of reinjury is the leading barrier, affecting up to half of those who do not return fully.⁷ Criteria-based progression matters more than the calendar: returning to cutting and pivoting sport before meeting the strength and hop benchmarks risks graft elongation and recurrent instability, particularly within the first 3 months while tunnel-graft integration completes.⁸

References

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Glossary

AAROM — Active-assisted range of motion; the patient initiates motion with assistance from gravity, a strap, or the therapist.

ADL — Activities of daily living.

AROM — Active range of motion; the patient moves the joint independently against gravity.

CKC — Closed kinetic chain; exercises performed with the foot fixed (e.g., squats, leg press), distributing patellofemoral load more favorably.

Cyclops lesion — A fibrous nodule in the anterior knee that can mechanically block full extension.

HHD — Hand-held dynamometer; a portable device for objective strength measurement.

ITB — Iliotibial band.

LSI — Limb Symmetry Index; the operative limb's value as a percentage of the contralateral limb ($\text{operative} \div \text{contralateral} \times 100$).

MMT — Manual muscle test; a graded (0–5) clinical assessment of muscle strength.

MPFL — Medial patellofemoral ligament; the primary passive restraint against lateral patellar translation.

NMES — Neuromuscular electrical stimulation; used to augment quadriceps activation.

OKC — Open kinetic chain; exercises performed with the foot free (e.g., seated knee extension).

PROM — Passive range of motion; the therapist or strap moves the joint while the patient stays relaxed.

ROM — Range of motion.

SLR — Straight-leg raise.

TTO — Tibial tubercle osteotomy; a bony realignment sometimes combined with MPFL reconstruction that requires a more protective, separate protocol.



Kevin M. Roth, MD

Board-Certified Orthopaedic Surgeon · Subspecialty Certification in Sports Medicine

Dr. Roth completed his orthopaedic surgery residency at Harvard Medical School and his sports medicine fellowship at the Kerlan-Jobe Orthopaedic Clinic in Los Angeles. In practice since 2013, he specializes in advanced arthroscopic techniques and sports medicine procedures, and sees patients at Palo Alto Medical Foundation's Palo Alto and Dublin offices. He welcomes calls from physical therapists about his patients or this protocol.

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