

POST-OPERATIVE REHABILITATION PROTOCOL

Multi-Ligamentous Knee Reconstruction with PCL

William McLaughlin, MD | Sports Medicine Surgery | Advanced Bone & Joint

Phase 1 | Protection | 0-6 Weeks

GOALS FOR THIS PHASE

- Protect grafts with strict NWB for 6 weeks.
- Avoid tibial rotation, hyperextension, and varus force at the knee.
- Brace locked in extension for ambulation and sleeping x 6 weeks.
- Maintain full extension; progress flexion ROM 0-90° during weeks 0-2.
- Initiate quadriceps activation and neuromuscular control while protecting the PCL graft.

Weight Bearing & Bracing

- NWB x 6 weeks.
- Hinged knee brace locked in extension for ambulation and sleeping x 6 weeks.
- If PCL reconstruction: dynamic knee brace used for 6 months.

Precautions

- Avoid tibial rotation, hyperextension, and varus force at the knee.
- If PCL reconstruction: perform ROM in prone position to avoid tension on the PCL graft from posterior tibial glide.
- If PCL reconstruction: NO active knee flexion or open-chain hamstring isometrics x 8 weeks.

Range of Motion

- ROM 0-90° for weeks 0-2; then progress as tolerated.
- Emphasize maintenance of full extension.
- Wall slides / supine heel slide with strap.
- Seated knee flexion with contralateral LE assist.
- If PCL reconstruction: prone knee flexion PROM with strap.

Neuromuscular Control

- Quad set, prone TKE, SLR in brace.
- Use of NMES if insufficient volitional quad activation.
- Quad isometrics at 90°, 60°, 30°, and 0° knee flexion.
- S/L hip abduction in brace.
- Prone hip extension in brace.

- Ankle mobility and resisted motions in all planes (supine, long-sit, or seated).
- Supine and seated core stabilization.
- Seated/supine anti-rotation / Pallof.
- Supine core isometrics with UE and LE dissociative movements.

Criteria to Progress

- Pain-free ROM 0-90°.
- Pain/swelling controlled.
- SLR without extensor lag.

Phase 2 | Restore ROM & Strength | 6-12 Weeks

GOALS FOR THIS PHASE

- Progress to PWB then FWB; wean off assistive device.
- Discharge crutches, then brace, when quad activation/strength is adequate.
- Restore PROM to 100% of contralateral side.
- Initiate balance training and closed-chain functional exercise.
- If PCL reconstruction: keep dynamic brace for 6 months.

Weight Bearing & Bracing

- Progress to PWB then FWB; wean off assistive device.
- Discharge crutches then brace when adequate quad activation/strength (no extension lag with SLR, no buckling with weight shifting).
- If PCL reconstruction: keep dynamic brace for 6 months.

Precautions

- No kneeling for 12 weeks post-op.

Range of Motion

- Stationary bike.

Proprioception & Balance

- Initiate balance training.

Strengthening

- Closed-chain functional exercise.
- Mini squat, step-up, lunging in sagittal plane (no flexion > 70°).
- Bridge.
- Side steps with band placed proximally to minimize varus force on knee.
- Core strength and endurance.

Criteria to Progress

- Pain-free, non-antalgic gait without assistive device for limited distances.
- PROM normalized to contralateral side 100%.
- Dynamometry \geq 80% compared to contralateral side.

Phase 3 | Dynamic Strength & Plyometrics | 12-20 Weeks

GOALS FOR THIS PHASE

- Initiate transverse-plane and multiplanar motions.
- Initiate plyometrics.
- Restore power.

Exercises

- Initiate transverse plane and multiplanar motions.
- Initiate plyometrics.
- Restore power.

Criteria to Progress

- Y-balance test $>$ 90%.
- 60-second continuous SL squat to 60° without femoral or lumbo-pelvic compensations.
- Plank and side plank 60 seconds without compensations.
- Dynamometry \geq 90% compared to contralateral side.
- Return to prior level of function with minimal symptoms.

Phase 4 | Return to Sport

GOALS FOR THIS PHASE

- Begin AlterG running at 20 weeks.
- Full body running at 24 weeks.
- Initiate sport-specific dynamic exercises.
- If PCL reconstruction: discharge dynamic brace once kneeling-stress X-rays show $<$ 2 mm side-to-side difference.

Return to Sport Progression

- AlterG initiated at 20 weeks for running.
- Full body running at 24 weeks.
- Sport-specific dynamic exercises.

- If PCL reconstruction: discharge dynamic brace if kneeling stress X-rays demonstrate < 2 mm of difference.

This protocol is a general guideline. Progression is patient-specific and at the discretion of William McLaughlin, MD.