



Multiligament Knee Injury (ACL/PCL +/- MCL/PLC)

Rehabilitation following surgery for multiligament knee injury (MLKI) or knee dislocation is an essential element of the treatment to achieve a full recovery. This protocol is intended to provide the user with instruction, direction, rehabilitative guidelines and functional goals. **It is not meant as a home program.** The physiotherapist must exercise their best professional judgment to determine how to integrate this protocol into an appropriate treatment plan. Some exercises may be adapted depending on the equipment availability at each facility. As an individual's progress is variable and each will possess various pre-operative deficiencies, this protocol must be individualized for optimal return to activity. There may be slight variations in this protocol if there are limitations imposed from the surgery and quality of individuals healing. Complete recovery after MLKI ranges from 9-12 months or longer, depending upon the procedure performed.

KEY POINTS

Multiligament knee reconstruction may include repair or reconstruction of two or more of the 4 main ligaments of the knee which include:

- Anterior cruciate ligament (ACL)
- Posterior cruciate ligament (PCL)
- Medial Collateral ligament (MCL)
- Lateral collateral ligament/Posterolateral Corner (LCL/PLC)

This specific rehabilitation protocol should be used when both the ACL and PCL are reconstructed, along with one or more of the other ligaments. Other structures such as the menisci may also be repaired which can alter the rehabilitation guidelines.

The goal of surgery is to restore normal knee stability and return to normal daily function. The severity of the injury sometimes will limit the degree of return to athletic activities. The goal of the rehabilitation program is to reduce stiffness, increase strength and return of function, without compromising the integrity of the reconstruction and the subsequent knee stability.

ROM, WEIGHT BEARING AND BRACING

Limitations in range of motion (ROM), weight bearing and the use of bracing are paramount to the success of the surgery. Each rehabilitation phase will allow for progression until normal ROM and ambulation is achieved.

Phase I: Protection & Early Passive ROM/Prevention of Stiffness (0-2 Weeks)

Brace and Weight Bearing:

- Tracker brace 0-90 degrees, locked in extension when ambulating; worn 24 hours per day
- Flat foot feather touch weight bearing with crutches

ROM:

- Prone or supine assisted knee flexion 0-90 degrees with proximal tibia protected against gravity
- No hyper extension
- Patella mobilization – medial/lateral and inferior/superior glides

Exercise Suggestions: NO ACTIVE HAMSTRINGS/KNEE FLEXION X 6 WEEKS

0-2 weeks:

- Isometric Quad contractions, gluteal activation (supine or standing), isometric hip adduction/abduction, ankle pumping

Modalities: Ice, compression and analgesics as needed to reduce pain and swelling

Phase II: ROM & Muscle Activation (2-6 Weeks)

Brace and Weight Bearing:

- Transfer to ***Ossur PCL Rebound brace*** once soft tissue swelling allows
- Flat foot partial weight bearing with crutches

ROM:

- Prone or supine assisted knee flexion 0-90 degrees with proximal tibia protected against gravity
- Patella mobilization – medial/lateral and inferior/superior glides

Exercise Suggestions: NO ACTIVE HAMSTRINGS/KNEE FLEXION X 6 WEEKS

- Isometric Quad contractions (+/- muscle stimulation)
- Gluteal activation (supine or standing), isometric hip adduction/abduction, ankle pumping
- Progress to mini squats, ***0-30 degrees with brace on (can weight bear as tolerated during this exercise)***
- Non-weight bearing hip stability exercises: abduction, extension, external rotation, clam shells, supine bridging on swiss ball
- Ankle theraband plantar flexion, sitting calf raises

Modalities: Ice, compression and analgesics as needed to reduce pain and swelling

Phase III: ROM and Strengthening (6-12 Weeks)

Brace and Weight Bearing:

- Continue ***Ossur PCL Rebound brace***
- Weight bear as tolerated until normal heel toe gait

ROM:

- Full range of motion
- Patella mobilization – medial/lateral and inferior/superior glides

Exercise Suggestions: CAN START ACTIVE HAMSTRINGS/KNEE FLEXION IN OSSUR PCL REBOUND BRACE (if not in rebound brace keep hamstrings quiet until 12 weeks post op)

- Gait retraining
- Quadriceps isometrics in long sitting, standing (+/- muscle stimulation)
- Weight shifting: 2 weigh scales → 50-50WB
- Leg extension (or quad over roll), active terminal knee extension with theraband
- Initiate abdominal and core strengthening (i.e. curl-ups, transversus abdominis with SLR x4)
- Standing hip flexion/extension, abduction/adduction → weights/pulleys/bands (watch for excessive trunk shift/sway)
- Shuttle™/leg press: 2 leg squat/calf raises, progress 2-1 leg; increase ROM & resistance
- Mini wall squats (30-60°) → 60°-90°; sit to stand
- Calf raises 2→1 foot, up on toes walking (when full weight bearing)

Modalities: Ice, compression and analgesics as needed to reduce pain and swelling

Phase IV: Advanced Strengthening and Return to Light Work (3-6 months)

Brace and Weight Bearing:

- Continue **Ossur PCL Rebound brace**
- Weight bear as tolerated

ROM:

- Full range of motion

Exercise Suggestions:

- Bike pendulums: ½ circles forward/backward → full circles – lower seat as tolerated
- Supine bridging: 2→1 leg →swiss ball→ bridge + knee flexion
- Hamstring curls: prone, sitting→progress 1-2 lb weights
- Continue core strengthening functionally (i.e. obliques, planks, Pilates)
- Sit to stand →lower bed height (watch mechanics) →single leg
- Progress resistance of Shuttle™working on strength & endurance, 2→1 leg
- Continue hip strengthening: weights, pulleys, tubing
- Static Lunge → dynamic lunge (with proper alignment: shoulders over knees over toes) → lunge walking as pain free range tolerates
- Progress to Low resistance stationary bike
- Wobble boards with support: side-to-side, forward/backward
- Single leg stance 30-60 seconds (when full WB)
- May begin jogging / running program once regained full range of motion with a quiet knee and appropriate neuromuscular control

Phase V: Advanced Strengthening and Return to Activities (6+ months)

Brace and Weight Bearing:

- Brace use as tolerated

Exercise Suggestions:

- Progress leg extensions with weight as tolerated (pain free arc)
- Bungee™ cord walking: forward, backward, side step, lunging → add speed/direction change as tolerated
- Forward and lateral step-ups 2-4-6" and eccentric lateral step down on 2-4-6" step with control (watch for hip hike or excessive ankle dorsiflexion)
- Squats, Lunges on Dynadisc, Airex, Bosu... as range tolerates
- Tubing kickbacks (mule kicks)
- Pro-Fitter™: hip abduction and extension → progress side-to-side
- Shuttle™ standing kick backs (hip/knee extension)
- Supine swiss ball → bridge + knee flexion → 1 leg
- Chair walking/stool pulls
- Hamstring curls: standing & sitting-weights/pulleys/ Bungee™
- Eccentric heel drops off step or Shuttle™ 2 → 1 leg
- Continue wobble boards and add basic upper body skills (i.e. throwing, catching)
- Single leg stance on unstable surface i.e. pillow, mini-tramp, BOSU™, Airex™, Dynadisc™
- Single leg stance performing upper body patterning specific to patient goal(s)
- Standing 747s: eyes open/closed → progress to mini trampoline
- May begin jogging / running program as tolerated
- Agility: Cariocas/grapevine, Figure 8's around cones, ladder drills, lateral shuffle cone-cone
- Side to side steps → jumps on the BOSU
- Line jumping, backward/forward/side-to-side → progress to diagonals / combined patterns; 2 → 1 leg
- Jumping: tuck jumps, box jumps, long jumps
- Skipping rope double and single leg
- Hopping: single-leg (distance), 6m timed, triple hop (distance), cross-over: 2 → 1 leg
- May implement sport-specific multi-directional drills/contact when adequate core/lower extremity patterning (stop and go drills, sideways and backwards drills, sprinting with cutting and pivoting)