

MPFL Reconstruction Rehabilitation Protocol

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General Principles and Precautions

- **The "Extension First" Rule:** Full terminal extension (0 degrees) must be achieved within the first 2 weeks to prevent permanent stiffness and abnormal patellar compression.
- **Quadriceps Activation:** Effective quadriceps firing is critical for patellar stability. Early use of Neuromuscular Electrical Stimulation (NMES) is encouraged.
- **Brace Compliance:** The hinged knee brace is worn 24 hours a day for the first 4 weeks (except during hygiene and flexibility exercises).
- **No Driving:** Do not drive while taking narcotic pain medication or until the operative leg has sufficient strength to perform an emergency brake maneuver.

Phase I: Immediate Post-Operative / Protection (Weeks 0–2)

Goals: Protect the graft, achieve 0 degrees of extension, and manage edema.

- **Brace Use:** Brace locked in full extension (0 degrees) for all ambulation and sleep.
- **Weight-Bearing:** Weight-Bearing As Tolerated (WBAT) with the brace locked in extension. Use crutches as needed for balance.
- **Range of Motion:**
 - **Extension:** Goal is 0 degrees (matching the uninvolved side).
 - **Flexion:** Goal is 0 to 60 degrees.
- **Exercises:**
 - **Quadriceps Activation:** Quad sets and Straight Leg Raises (SLR). **Important:** If a quadriceps "lag" is present during SLR, the exercise must be performed with the brace locked in extension.
 - **Patellar Mobilizations:** Begin superior and inferior glides once the incision is healed.
 - **Ankle Pumps:** daily to prevent DVT.

Phase II: Mobilization & Brace Weaning (Weeks 2–4)

Goals: Progress flexion to 90 degrees and normalize gait mechanics.

- **Brace:** Brace remains locked in extension for walking until the end of Week 4.
- **Motion Progression:**
 - **Flexion Goal:** Reach **90 degrees** by the end of Week 4.
 - **Stationary Bike:** Begin when flexion reaches 90 degrees. Start with no resistance.
- **Strengthening:**
 - **Closed-Chain:** Initiate bilateral mini-squats (0 to 30 degrees) and toe raises.
 - **Core/Hip:** Side-lying hip abduction and clamshells.

Phase III: Intermediate Strengthening (Weeks 4–12)

Goals: Discontinue brace, restore full range of motion, and build bilateral strength.

- **Brace:** **Discontinue the brace at Week 4**, provided the patient has excellent quadriceps control (no SLR lag) and no gait deviation.
- **Motion Progression:**
 - **Flexion Goal:** Gradually achieve full range of motion (0 to 135+ degrees) by week 8.
- **Strengthening:**
 - **Bilateral Loading:** Progress mini-squats (0 to 60 degrees) and leg press.
 - **Step-Ups:** Focus on forward step-ups (2-inch to 4-inch), ensuring the knee does not collapse inward (valgus).
 - **Proprioception:** Single-leg balance on stable and unstable surfaces.

Phase IV: Running & Advanced Loading (Weeks 12–16)

Goals: Initiate jogging, advance single-leg tasks, and begin impact drills.

- **Running Initiation:** **Begin running at Week 12.** Start with a "Walk-Run" progression on flat surfaces or a treadmill.
- **Criteria for Running:** Full range of motion, no joint swelling, and quadriceps strength at least 70 percent of the uninvolved side.

- **Strengthening:**
 - **Lateral Movements:** Side-steps and lateral shuffles with resistance bands.
 - **Single-Leg Loading:** Single-leg squats and Bulgarian split squats.
 - **Plyometrics:** Initiate bilateral jumping and landing mechanics.
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Phase V: Return to Sport (Week 16+)

Goals: Full return to high-level athletics.

- **Return to Sport:** contingent on passing functional testing.
 - **Agility:** Figure-8 running, shuttle runs, and sport-specific cutting drills.
 - **Discharge Criteria:**
 - Quadriceps and Hamstring strength greater than 90 percent of the uninvolved side.
 - Limb Symmetry Index (LSI) > 90 percent on hop testing.
 - Full, non-painful active range of motion.
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Clinical Pearls for the Therapist

1. **Valgus Control:** During running and jumping initiation, ensure the knee stays aligned over the second toe. Avoid "dynamic valgus" (medial collapse) to protect the graft.
2. **Extension Lag:** If the patient cannot hold a straight leg during a SLR at Week 4, do not discontinue the brace until the quadriceps can effectively lock the knee.
3. **Lateral Dip Test:** Use the 4-inch lateral dip test to assess eccentric control of the quadriceps before allowing the patient to transition from walking to jogging.