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# Post-operative Rehabilitation Protocol

**Medial Patellofemoral Ligament (MPFL) Reconstruction / Tibial Tubercle Osteotomy (TTO) / Trochleoplasty**

## Phase 1 (0-6 weeks post op):

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| **Goals** | • Protect Repair<br>• Control post-operative pain, inflammation, and swelling<br>• Prevent muscle atrophy – regain active quadriceps contraction<br>• Emphasis on compliance to HEP and WB precautions/restrictions |
| **Brace/Precautions/ Crutch Use** | • Weight bearing:<br>  ○ 0-6 weeks: 50% WB – avoid full WB for first 6 weeks<br>• Brace: 0-2 weeks: 0-70°, 2-4 weeks: 0-90°, unlock brace after week 4<br>  ○ Brace may be removed for hygiene, therapy, sleeping, and while sitting<br>  ○ Avoid ambulation without brace for first 6 weeks<br>• Avoid lateralization of patella<br>• Avoid AAROM knee extension with significant quad atrophy, and articular cartilage injury<br>• Follow ROM guidelines per surgeon's suggestion |
| **Range of Motion** | • Active assisted and passive knee flexion and knee extension ROM<br>  ○ 0-90° with no forced flexion<br>• 0-2 weeks: 0-70° in brace<br>• 2-4 weeks: 0-90° in brace<br>• 4-6 weeks: unlock brace |
| **Strengthening** | • Restore quadriceps recruitment through strengthening exercises<br>• Hip progressive resistive exercises: pain-free SLR with brace if lag is present<br>• Distal strengthening |
| **Home Instructions** | • Keep surgical dressings clean and dry<br>• Change surgical bandages on the 2nd day after surgery (keep covered until first clinic visit)<br>• Avoid getting sutures wet until at least 5 days after surgery (do not scrub, soak, or submerge the incisions)<br>• Note DVT (blood clot) prophylaxis medications provided by your surgeon to take following surgery – follow those instructions carefully |
| **Suggested Exercises** | • Ankle pumps<br>• Quad sets (consider NMES for poor quad sets)<br>• Glute Sets<br>• SLR – 4 way<br>• Hamstring activation – Heel slides (out of brace, up to 15 degrees beyond the brace setting at each time point), hamstring sets, bridges |

## Phase 2 (7-10 weeks post op):

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| **Goals** | • Control pain and inflammation<br>• Promote healing<br>• Achieve normal knee ROM<br>• Good patella mobility<br>• Good quad contraction |

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| | • Progress to achieve normal gait mechanics<br>• Pain-free ADLs and pain-free arc of motion in therapy |
| **Brace/Precautions/ Crutch Use** | • Be aware of concomitant procedures and restrictions they pose to rehabilitation (tibial tubercle transfer or articular cartilage procedure)<br>• Avoid lateralization of the patella<br>• Normalize gait pattern with fully extended knee in an effort to fight quadriceps avoidance |
| **Range of Motion** | • Knee extension: full PROM and AAROM to full knee extension (if no cartilage injury)<br>• Knee flexion: (achieve in seated position and with supine wall slides)<br>  ○ Limit ROM 0°-110° (until 8 weeks)<br>  ○ 0°-120° by 10 weeks<br>  ○ 0°- full flexion 10+ weeks |
| **Strengthening** | • Progress quadriceps strengthening<br>• Advance proximal strength and core training<br>• Initiate balance and proprioceptive training |
| **Home Instructions** | • Restore normal activities of daily living |
| **Suggested Exercises** | • Continue Phase 1 exercises as appropriate<br>• Gait training: heel toe gait pattern [with adequate quad control (SLR without a lag, ability to achieve terminal knee extension) and knee ROM] to ensure normal loading response<br>• Underwater treadmill (adequate wound healing) or anti-gravity treadmill for gait: Low grade elevation or retro-walking<br>• Progress pain-free arc of motion, close chain preferred<br>• Leg press – monitor arc of motion (bilateral, eccentric)<br>• Initiate forward step up (FSU) progression, 6” step with adequate strength<br>• Stationary Bike – progress short crank to standard crank as ROM allows (115° flexion while sitting)<br>• Hip extension with knee flexion, side planks, bridge<br>• Initiate and proprioceptive training: double limb support on progressively challenging surfaces to single limb support on level surface only with demonstration of good alignment, stability and control |

## Phase 3 (11-18+ weeks):

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| **Goals** | • Pain-free with ADLs, therapeutic exercise<br>• Maintain normal knee ROM<br>• Maintain normal gate on level surfaces and stairs<br>• Good single limb dynamic balance<br>• Initiate running program, plyometrics (bilateral)<br>• Achieve patellar tracking symmetry and alignment during movements such as squatting and jumping in place |
| **Precautions** | • Avoid symptom provocation<br>• Correct any gait deviations in ROM or patellar tracking |
| **Range of Motion** | • Maintain full ROM by 12 weeks |
| **Strengthening** | • Advance proximal strength through functional activities<br>• Balance progression with postural alignment and N-M control |
| **Home Instructions** | • Restore normal activities of daily living<br>• Restore pre-operative activity level |
| **Suggested Exercises** | • Balance progression with postural alignment and N-M control (static to dynamic, introduce different planes of motion, challenging surfaces)<br>• Gait training with emphasis on heel-toe gait pattern on loading response<br>• Address muscle imbalances based on evaluation<br>• Promote cross training: elliptical, stationary bike, swimming<br>• Initiate running progression (late phase) |

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| | • Initiate bilateral leg plyometric program with MD clearance and evidence of good eccentric quadriceps control |

## Phase IV: Advanced Strengthening and Function (19-24 weeks post-op)

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| **Goals** | • Lack of pain, apprehension with sport specific movements<br>• Maximize strength and flexibility as to meet demands of individual's sport activity<br>• Demonstrate patellar tracking symmetry and alignment through movement patterns such as jumping and single leg squats<br>• If isokinetic testing available, aim for 85% limb symmetry index (LSI) at 180° / sec and 300°/ sec<br>• Cardiovascular fitness to meet demands of sport |
| **Precautions** | • Pain with therapeutic exercise & functional activities<br>• Inadequate strength, functional strength, ROM, flexibility, fitness when returning to sport |
| **Range of Motion** | • Maintain full ROM |
| **Strengthening** | • Continue to advance LE strengthening, flexibility, dynamic single limb stability & agility programs<br>• Advance core stability and strength |
| **Home Instructions** | • Maintain normal activities of daily living |
| **Suggested Exercises** | • Continue to advance LE strengthening, flexibility, dynamic single limb stability & agility programs<br>• Address muscle imbalances – evaluation-based<br>• Advance core stability<br>• Continue cross training<br>• Advance plyometric program with MD clearance and evidence of good eccentric quadriceps control<br>  ○ Vertical jumping progression: Jump down<br>  ○ Horizontal jumping progression: Broad jump, single leg landings<br>  ○ Progress running program<br>  ○ Cutting, deceleration, change of direction with MD clearance and dynamic single limb stability |

## CRITERIA FOR DISCHARGE/ RETURN TO SPORT:

• If available - Isokinetic test at 180°/ sec and 300°/ sec: 85% limb symmetry index (LSI)
• Demonstrate symmetry, quality, and alignment during selected movement patterns
• Medical clearance by surgeon for return to play progression
• Lack of apprehension with sport specific movements
• Hop Test > 85% limb symmetry
• Demonstrate quality of movement with required sports specific activities

For any questions about operative details or rehabilitation guidelines, please contact the respective surgeon's Athletic Trainer at the contact information found at this link: https://med.virginia.edu/orthopaedic-surgery/orthopaedic-divisions/sports-medicine/protocols/