

## Post-operative Rehabilitation Protocol

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

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

<b>Goals</b>	<ul style="list-style-type: none"> <li>• Protect Repair</li> <li>• Control post-operative pain, inflammation, and swelling</li> <li>• Prevent muscle atrophy – regain active quadriceps contraction</li> <li>• Emphasis on compliance to HEP and WB precautions/restrictions</li> </ul>
<b>Brace/Precautions/ Crutch Use</b>	<ul style="list-style-type: none"> <li>• Weight bearing:             <ul style="list-style-type: none"> <li>○ 0-6 weeks: 50% WB – avoid full WB for first 6 weeks</li> </ul> </li> <li>• Brace: 0-2 weeks: 0-70°, 2-4 weeks: 0-90°, unlock brace after week 4             <ul style="list-style-type: none"> <li>○ Brace may be removed for hygiene, therapy, sleeping, and while sitting</li> <li>○ Avoid ambulation without brace for first 6 weeks</li> </ul> </li> <li>• Avoid lateralization of patella</li> <li>• Avoid AAROM knee extension with significant quad atrophy, and articular cartilage injury</li> <li>• Follow ROM guidelines per surgeon's suggestion</li> </ul>
<b>Range of Motion</b>	<ul style="list-style-type: none"> <li>• Active assisted and passive knee flexion and knee extension ROM             <ul style="list-style-type: none"> <li>○ 0-90° with no forced flexion</li> </ul> </li> <li>• 0-2 weeks: 0-70° in brace</li> <li>• 2-4 weeks: 0-90° in brace</li> <li>• 4-6 weeks: unlock brace</li> </ul>
<b>Strengthening</b>	<ul style="list-style-type: none"> <li>• Restore quadriceps recruitment through strengthening exercises</li> <li>• Hip progressive resistive exercises: pain-free SLR with brace if lag is present</li> <li>• Distal strengthening</li> </ul>
<b>Home Instructions</b>	<ul style="list-style-type: none"> <li>• Keep surgical dressings clean and dry</li> <li>• Change surgical bandages on the 2<sup>nd</sup> day after surgery (keep covered until first clinic visit)</li> <li>• Avoid getting sutures wet until at least 5 days after surgery (do not scrub, soak, or submerge the incisions)</li> <li>• Note DVT (blood clot) prophylaxis medications provided by your surgeon to take following surgery – follow those instructions carefully</li> </ul>
<b>Suggested Exercises</b>	<ul style="list-style-type: none"> <li>• Ankle pumps</li> <li>• Quad sets (consider NMES for poor quad sets)</li> <li>• Glute Sets</li> <li>• SLR – 4 way</li> <li>• Hamstring activation – Heel slides (out of brace, up to 15 degrees beyond the brace setting at each time point), hamstring sets, bridges</li> </ul>

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

<b>Goals</b>	<ul style="list-style-type: none"> <li>• Control pain and inflammation</li> <li>• Promote healing</li> <li>• Achieve normal knee ROM</li> <li>• Good patella mobility</li> <li>• Good quad contraction</li> </ul>
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	<ul style="list-style-type: none"> <li>• Progress to achieve normal gait mechanics</li> <li>• Pain-free ADLs and pain-free arc of motion in therapy</li> </ul>
<b>Brace/Precautions/ Crutch Use</b>	<ul style="list-style-type: none"> <li>• Be aware of concomitant procedures and restrictions they pose to rehabilitation (tibial tubercle transfer or articular cartilage procedure)</li> <li>• Avoid lateralization of the patella</li> <li>• Normalize gait pattern with fully extended knee in an effort to fight quadriceps avoidance</li> </ul>
<b>Range of Motion</b>	<ul style="list-style-type: none"> <li>• Knee extension: full PROM and AAROM to full knee extension (if no cartilage injury)</li> <li>• Knee flexion: (achieve in seated position and with supine wall slides) <ul style="list-style-type: none"> <li>○ Limit ROM 0°-110° (until 8 weeks)</li> <li>○ 0°-120° by 10 weeks</li> <li>○ 0°- full flexion 10+ weeks</li> </ul> </li> </ul>
<b>Strengthening</b>	<ul style="list-style-type: none"> <li>• Progress quadriceps strengthening</li> <li>• Advance proximal strength and core training</li> <li>• Initiate balance and proprioceptive training</li> </ul>
<b>Home Instructions</b>	<ul style="list-style-type: none"> <li>• Restore normal activities of daily living</li> </ul>
<b>Suggested Exercises</b>	<ul style="list-style-type: none"> <li>• Continue Phase 1 exercises as appropriate</li> <li>• 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</li> <li>• Underwater treadmill (adequate wound healing) or anti-gravity treadmill for gait: Low grade elevation or retro-walking</li> <li>• Progress pain-free arc of motion, close chain preferred</li> <li>• Leg press – monitor arc of motion (bilateral, eccentric)</li> <li>• Initiate forward step up (FSU) progression, 6" step with adequate strength</li> <li>• Stationary Bike – progress short crank to standard crank as ROM allows (115° flexion while sitting)</li> <li>• Hip extension with knee flexion, side planks, bridge</li> <li>• 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</li> </ul>

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

<b>Goals</b>	<ul style="list-style-type: none"> <li>• Pain-free with ADLs, therapeutic exercise</li> <li>• Maintain normal knee ROM</li> <li>• Maintain normal gait on level surfaces and stairs</li> <li>• Good single limb dynamic balance</li> <li>• Initiate running program, plyometrics (bilateral)</li> <li>• Achieve patellar tracking symmetry and alignment during movements such as squatting and jumping in place</li> </ul>
<b>Precautions</b>	<ul style="list-style-type: none"> <li>• Avoid symptom provocation</li> <li>• Correct any gait deviations in ROM or patellar tracking</li> </ul>
<b>Range of Motion</b>	<ul style="list-style-type: none"> <li>• Maintain full ROM by 12 weeks</li> </ul>
<b>Strengthening</b>	<ul style="list-style-type: none"> <li>• Advance proximal strength through functional activities</li> <li>• Balance progression with postural alignment and N-M control</li> </ul>
<b>Home Instructions</b>	<ul style="list-style-type: none"> <li>• Restore normal activities of daily living</li> <li>• Restore pre-operative activity level</li> </ul>
<b>Suggested Exercises</b>	<ul style="list-style-type: none"> <li>• Balance progression with postural alignment and N-M control (static to dynamic, introduce different planes of motion, challenging surfaces)</li> <li>• Gait training with emphasis on heel-toe gait pattern on loading response</li> <li>• Address muscle imbalances based on evaluation</li> <li>• Promote cross training: elliptical, stationary bike, swimming</li> <li>• Initiate running progression (late phase)</li> </ul>

	<ul style="list-style-type: none"> <li>Initiate bilateral leg plyometric program with MD clearance and evidence of good eccentric quadriceps control</li> </ul>
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#### Phase IV: Advanced Strengthening and Function (19-24 weeks post-op)

<b>Goals</b>	<ul style="list-style-type: none"> <li>Lack of pain, apprehension with sport specific movements</li> <li>Maximize strength and flexibility as to meet demands of individual's sport activity</li> <li>Demonstrate patellar tracking symmetry and alignment through movement patterns such as jumping and single leg squats</li> <li>If isokinetic testing available, aim for 85% limb symmetry index (LSI) at 180° / sec and 300° / sec</li> <li>Cardiovascular fitness to meet demands of sport</li> </ul>
<b>Precautions</b>	<ul style="list-style-type: none"> <li>Pain with therapeutic exercise &amp; functional activities</li> <li>Inadequate strength, functional strength, ROM, flexibility, fitness when returning to sport</li> </ul>
<b>Range of Motion</b>	<ul style="list-style-type: none"> <li>Maintain full ROM</li> </ul>
<b>Strengthening</b>	<ul style="list-style-type: none"> <li>Continue to advance LE strengthening, flexibility, dynamic single limb stability &amp; agility programs</li> <li>Advance core stability and strength</li> </ul>
<b>Home Instructions</b>	<ul style="list-style-type: none"> <li>Maintain normal activities of daily living</li> </ul>
<b>Suggested Exercises</b>	<ul style="list-style-type: none"> <li>Continue to advance LE strengthening, flexibility, dynamic single limb stability &amp; agility programs</li> <li>Address muscle imbalances – evaluation-based</li> <li>Advance core stability</li> <li>Continue cross training</li> <li>Advance plyometric program with MD clearance and evidence of good eccentric quadriceps control <ul style="list-style-type: none"> <li>Vertical jumping progression: Jump down</li> <li>Horizontal jumping progression: Broad jump, single leg landings</li> <li>Progress running program</li> <li>Cutting, deceleration, change of direction with MD clearance and dynamic single limb stability</li> </ul> </li> </ul>

#### 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