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KNEE MEDIAL PATELLOFEMORAL LIGAMENT (MPFL) RECONSTRUCTION POST-OPERATIVE GUIDELINES

Post-Operative Phase 1: Protection Phase (Weeks 0-6)

PRECAUTIONS

• Weight bearing as tolerated (WBAT) with brace locked in 0° KE
  - **If concomitant procedures done (TTO/DFO, cartilage procedure)- defer to those protocols for WB status and ROM guidelines**
• Avoid ambulation without crutches if poor load tolerance evident
• Do not perform AROM open chain KE

TREATMENT RECOMMENDATIONS

• Patient education: emphasize patient compliance with HEP and weight bearing precautions/ progression
  - WBAT with brace locked in extension with crutches
  - Cryotherapy: home cold therapy unit if applicable
  - Electrical stimulation (NMES) for quadriceps re-education: quadriceps set with towel roll under knee: 20 minutes, 2-3x/day
  - Continuous passive motion machine (CPM) with concomitant cartilage procedure: 6-8 hours/ day
  - Sitting knee ROM exercise: AAROM KF to PROM KE
• Quadriceps set with towel roll under knee
• Hip progressive resisted exercises: pain-free; SLR with brace if lag is present
• Distal strengthening (e.g., plantarflexion with band resistance)
• Flexibility exercises, as needed (e.g., hamstrings, gastrocnemius)
• Consider blood flow restriction (BFR) program with FDA approved device and qualified therapist if patient cleared by MD
• Short crank bicycle if achieved ROM 80°-90° KF
• Patella mobilization as per surgeon

CRITERIA FOR ADVANCEMENT

• Independent with HEP
• Minimal post-operative pain/ swelling
• Good patellar mobility in medial direction
• Knee ROM: 0 - >90
• Able to SLR pain-free without quadriceps lag
• Independent ambulation with brace locked in extension and appropriate assistive device on level surfaces and stairs

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Post-Operative Phase 2: Address Gait (Weeks 7-10)

PRECAUTIONS

- Concomitant procedures: TTT/TTO, articular cartilage procedure, PFJR, osteotomy
- Do not perform AROM open chain KE
- Avoid lateralization of the patella
- Pathological gait pattern (quadriceps avoidance)
- Avoid discharge of assistive device too soon
- Avoid pivoting or turning with foot planted

TREATMENT RECOMMENDATIONS

- Patient education: activity modification, progression of gait training, cryotherapy
- ROM exercises
  - Sitting PROM KE in a pain-free arc of motion to AAROM KF
  - KF: Progressing from sitting to stair ROM
    - Supine wall AAROM as tolerated (requires ~125° KF in sitting, quadriceps control)
    - If difficulty with progressing ROM, then unlock brace for ambulation with crutches
- Gait training
  - Emphasize heel toe gait pattern with assistive device and brace open to 90° or functional brace
    - Determining factors to unlocking post-operative brace or applying functional brace include: Adequate quadriceps control as demonstrated by SLR without a lag or pain
    - Determining factors to discharge assistive device: No quadriceps avoidance during loading response; tolerance to weight bearing, swelling, pain
    - Treatment techniques to ensure normal loading response: Low grade elevation treadmill walking or retro-walking to encourage neuromuscular control with KF during loading response, weight shifting, closed chain KE with resistance band behind knee, hydro–treadmill (given adequate wound healing) or anti-gravity treadmill
- Quadriceps strengthening: progress pain-free arc of motion, closed chain only
  - Continue with NMES, biofeedback, quadriceps set, as needed
  - Leg press: monitor arc of motion for pain and compensations (bilateral progressing to single, eccentric)
- Functional training:
  - Squat progression once able to press close to body weight with bilateral leg press: sit to stand with chair/ platform and cushions; pain-free and compensatory-free arc of motion; monitor for hip first strategy and symmetry

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- Leg press for SL static loading with soft knee; contact guard knee to prevent buckling
- Initiate forward step up (FSU) progression :4”-6” step with adequate strength (without compensation)
- Consider BFR program with FDA approved device and qualified therapist if patient cleared by MD

•Stationary bicycle

- Progress from short crank (short crank requires > 80° KF in sitting)
- Standard crank requires 115° KF in sitting, 80 revolutions per minute (RPM)

• Advance proximal strength and core training: (e.g., side planks, bridge)
• Initiate balance and proprioceptive training: double limb support on progressively challenging surfaces to SL support on level surface only with demonstration of good alignment, stability and neuromuscular control
• Patellar mobilization, MD directed
• Advance HEP as tolerated
• Continue phase I exercises, as appropriate

CRITERIA FOR ADVANCEMENT

• ROM 0° KE → 125° KF, no limits
• Good quadriceps contraction
• Normal gait pattern
• Good patella mobility
• Postural stability, alignment and neuromuscular control in SL stance

EMPHASIZE

• Normalize gait pattern with good neuromuscular control in the stance phase
• Minimizing knee effusion
• Postural stability and lower extremity alignment
• Symptom control with ADLs, therapeutic exercise

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Post-Operative Phase 3: Address Impairments (Weeks 11-18 +)

PRECAUTIONS

• Do not perform AROM open chain knee extension
• Avoid gait deviations such as quadriceps avoidance
• Avoid “too much, too soon” progression

TREATMENT RECOMMENDATIONS

• HEP
• Quadriceps strengthening: progress as tolerated, monitor arc of motion, closed chain only
- Squat progression: chair squats to free squats
- FSU progression: 6” step progressing to 8” step (dependent on patient height)
- Eccentric quadriceps strength:
  - Eccentric leg press
  - SL squat to chair with support of opposite foot
  - Forward step down (FSD) progression: begin with 4” step ultimately progressing to 8” step (dependent on patient height)

• SL strengthening: SL squat to chair, leg press eccentric, SL bridge, SL Romanian Deadlift (RDL)
• ROM exercises
- AAROM KE to AAROM KF in sitting to supine wall slides to stair stretch

• Gait training to emphasize heel-toe gait pattern with emphasis on loading response
• Advance proximal strength:
- Bridging progression
- Standing clam shell, clock,
- RDL, windmill, lawn mower
- Core training (planks, side planks, Sahrmann progression)

• Balance progression with postural alignment and neuromuscular control (static to dynamic, introduce different planes of motion, challenging surfaces)
• Address muscle imbalances – evaluation-based (e.g., gluteal strength, 2 joint hip flexor length, quadriceps length, calf length)
• Address biomechanical factors – evaluation-based (e.g., ankle mobility)
• Cross training: elliptical trainer initiated with good strength/ quality during 6” FSU, bicycle (80 RPM), swimming (avoid breaststroke, butterfly)

CRITERIA FOR ADVANCEMENT

• Medical clearance by MD to begin running and plyometrics
• ROM within normal limits
• Demonstrate SL strength and stability

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- Ability to demonstrate alignment, control, stability in SL stance during dynamic activities
- Core stability: SL bridge > 30 seconds
- Able to ascend 6”/ 8” step with good control
- Able to descend 6”/ 8” step with good control and alignment throughout the full arc of motion
- Movement strategy, alignment, symmetry (double leg tasks), control (SL tasks) during selected movement patterns
- 90% limb symmetry index (consider hand-held dynamometry, 1 repetition maximum, or 3 repetition maximum on leg press)
- Quantitative assessments > 90% contralateral LE
    - Note that the uninvolved side may be subpar
- Independent with HEP

EMPHASIZE

- Normal gait
- Identifying and addressing muscle/ soft tissue imbalances
- SL strengthening
- Neuromuscular control
- Functional progression
- Quality of movement: symmetry during double limb tasks, hip movement strategy, alignment during selected movement patterns (squat, SL squat to chair)

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Post-Operative Phase 4: Functional Strengthening (Months 5-7)

PRECAUTIONS

• Ensure adequate strength, functional strength, ROM, flexibility, and fitness when returning to sport

TREATMENT RECOMMENDATIONS

• Continue to advance LE strengthening (SL strength and eccentric quadriceps), flexibility, dynamic SL stability and agility programs
• Advance core stability
• Cross training
• Initiate plyometric program progressing from double leg to SL and from vertical to horizontal:
- Vertical jumping progression
  - Double leg box jump → jump in place → drop jump
  - SL box jump → jump in place → drop jump
- Horizontal jumping progression
  - Forward hops (double leg to SL)
  - Side to side hops (double leg to SL)
  - Broad jump (double leg to SL)
  - Side to side jumps

• Initiate running program on non-consecutive days with interval training

CRITERIA FOR DISCHARGE OR ADVANCEMENT TO PHASE 5 IF RETURNING TO PLAY

• Successful completion of plyometric training
• Maximize strength and flexibility as to meet demands of individual's sport activity
• Ability to demonstrate hip strategy, symmetry (double leg tasks), control (SL tasks) and alignment during selected movement patterns: squat, FSD, jumping tasks, SL squat
• Lack of apprehension with sport specific movements

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Post-Operative Phase 5: Return to Play (Months 7+)

PRECAUTIONS

• Avoid inadequate rest
• Note the importance of gradual return to participation with load and volume monitoring under guidance of physical therapist, exercise physiologist, physician, certified athletic trainer (ATC) and coach

TREATMENT RECOMMENDATIONS

• Gradually increase volume and load to mimic load necessary for return to activity
• Progress movement patterns specific to patient's desired sport or activity
• Progression of agility, cutting, and deceleration
• Increase cardiovascular load to match that of desired activity
• Continue to advance LE strengthening, flexibility, dynamic SL stability, core stability and agility
• Advance plyometric program with MD clearance
  - Horizontal jumping progression: broad jump to hop to opposite to SL hop
  - Progress running program

CRITERIA FOR DISCHARGE

• Medical clearance by MD to initiate return to play progression
• Quantitative assessments **95%** of contralateral extremity
• Hop test **> 95%** limb symmetry with good alignment, strategy and control
• Lack of pain, apprehension with sport specific movements
• Ability to decelerate with good control, and alignment on SL
• Independent with gym program for maintenance and progression of therapeutic exercise program
• Demonstrates quality of movement with required sports-specific activities
• Lack of apprehension with sport specific movements