Dr. Tyler Kent
Tylerkentmd.com
PATELLA FRACTURE AND QUAD/PATELLA TENDON REPAIR REHABILITATION PROTOCOL

The following Post-Operative Patella Fracture and Quad/Patella Tendon Repair Guidelines were developed for patients undergoing open repair of a patella fracture or quadriceps or patella tendon repair. Progression is both criteria-based and patient specific. Phases and time frames are designed to give the clinician a general sense of progression and will be dependent on adequate soft tissue healing time. The program should balance the aspects of tissue healing and appropriate interventions to maximize function.

For patients with comorbidities such as diabetes, osteoporosis or high Body Mass Index (BMI), healing times and range of motion (ROM) progressions may be delayed.

Typically, patients are discharged from the hospital on the day of surgery. The knee is placed in a brace locked in extension (straight knee) to protect the repair. At 6 weeks (Post-Operative Phase 2), the brace is weaned until no longer needed. Patients are encouraged to begin physical therapy the first week after surgery. Patients may walk with the brace on and locked in extension, but should avoid flexing (bending) the knee too soon. During this period, they are encouraged to elevate the leg and control swelling.

Day of Surgery. Rest and recover.

PRECAUTIONS	- Avoid prolonged standing and walking - Avoid putting heat on knee - Avoid weightbearing without brace - Use crutches as needed for stability - Keep knee extended, do not remove brace
Emphasize	- Control swelling; cryotherapy and elevation - Independent transfers - Gait training with appropriate assistive device - Appropriate balance of activity and rest
Assessment	- Mental status: Alert and Oriented x3 - Wound status - Swelling - Post-anesthesia sensory motor screening - Functional status including ability to manage brace
Treatment Recommendations	- Transfer training - Gait training WBAT with assistive device on level surfaces and stairs * Patient education: • Edema management • Activity modification • Brace management * Initiate and emphasize importance of HEP • Quadriceps sets, gluteal sets, ankle pumps,
Criteria for Discharge	- Independent ambulation with appropriate assistive device - Independent brace management - Independent with transfers - Independent with ADLs - Independent with home exercise program (HEP)

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Phase I, 0-6 weeks. Pain and edema control, start flexibility and strengthening exercises.

PRECAUTIONS	- Avoid ambulation without brace locked at 0° - Avoid heat application - Avoid prolonged standing/walking - Use crutches as needed for stability - Keep knee extended, do not remove brace
Emphasize	- Control swelling; cryotherapy and elevation - Independent transfers - Gait training with appropriate assistive device - Appropriate balance of activity and rest
Assessment	- LEFS, IKDC, SANE, ACL RSI, NPRS - Swelling - Girth measurements - Gait and Neurovascular assessment - Wound status - Quality of quadriceps contraction
Treatment Recommendations	- Must adhere to MD ROM limits: Knee flexion progression: Weeks 0-2: 0-30° Weeks 2-4: 0-60° Weeks 4-6: 0-90° - Quadriceps re-education: quadriceps isometrics in extension - SLR in all planes (With brace locked at 0° in supine) - Scar mobilization - Patella mobilization - Hip progressive resistive exercises - Calf strengthening (Unilateral elastic band & bilateral calf raises) - Upper extremity ergometry, as tolerated - Gait training with progressive WB • Gradual progression with brace locked at 0° with crutches - Edema management, e.g. cryotherapy (no submersion), elevation, gentle edema mobilization avoiding incision - Progressive home exercise program
Criteria for Advancement	- Knee ROM 0°-90° - Pain and swelling controlled

Phase II, 7-12 weeks. Regain full range of motion and normal gait pattern.

PRECAUTIONS	- Avoid aggressive strengthening and activities that increase pain and effusion - WBAT locked in extension until 8 weeks - Gait training with flexion stop at 60° once patient demonstrates good quad control - No WB with flexion >90° - Monitor tolerance to load, frequency, intensity and duration - Avoid too much too soon
Emphasize	- Full range of motion - No extensor lag - Normalize gait
Assessment	- LEFS, IKDC, SANE, ACL RSI, NPRS - Swelling - Girth measurements - Gait and Neurovascular assessment - Wound status - Patellar mobility - Quality of quadriceps contraction - LE AROM and PROM **Notify MD if knee flexion:** <90° by 8 weeks <110° by 10 weeks
Treatment Recommendations	- Patellar mobilization - AROM knee flexion to tolerance - Pool ambulation (if wound OK) - Patellar mobilizations - Short crank regular bike (flexion <110°) - Leg press (bilateral 0-90°) - Initiate forward step-up program - Initiate squat program (wall slide) - Proprioceptive exercises - Retro-ambulation - Continue foundational hip-gluteal progressive resistive exercises - Continue hamstring and calf strengthening - Flexibility exercises and foam rolling - Core and UE strengthening - Proprioception training - Cardiovascular conditioning
Criteria for Advancement	- Full symmetrical knee ROM - Normal gait pattern - Symmetrical squat to parallel

Phase III, 13-18 weeks. Begin advancing strengthening exercises.

PRECAUTIONS	- Initiate return to running/sport only when cleared by physician - Avoid pain with exercises and functional training - Monitor tolerance to load, frequency, intensity and duration - Avoid too much too soon - Caution with reciprocal stair decent - No running or sport
Emphasize	- Full ROM, normal gait pattern - Descend 8" step with good eccentric leg control - Address impairments - Return to normal functional activities
Assessment	- LEFS, IKDC, SANE, ACL RSI, NPRS - Swelling - Girth measurements - LE AROM and PROM - Functional assessment, e.g. single leg stance, step ups/downs, squat, gait - Balance testing, e.g. Star Excursion Test, Biodex Balance SystemTM - Quadriceps isometrics or isokinetic testing - QMA – Quality of Movement Testing
Treatment Recommendations	- Swimming OK at 12 weeks - Incorporate quadriceps flexibility exercises - Advance closed chain exercises, begin open chain at 16 weeks - Initiate step-down program - Isokinetic/isotonic knee extension - Advanced proprioceptive training - Agility training * Functional strengthening • Progress squats to 0°-90°, initiating movement with hips • Progress to single leg squats • Forward step-up and step-down progression • Progress lateral step-ups, crossovers • Progress lunges - Continue foundational hip-gluteal progressive resistive exercises - Continue hamstring and calf strengthening - Flexibility exercises and foam rolling - Core and UE strengthening - Consider BFR program - Progress cardiovascular conditioning
Criteria for Advancement	- No swelling - Normal neurovascular assessment - Normal scar and patellar mobility - Normal quadriceps contraction - Full LE ROM, flexibility and strength - Quantitative assessments = 85% of contralateral lower extremity

Phase IV, weeks 18 - discharge. Maximize strength, flexibility, and endurance with sport specific movements.

PRECAUTIONS	- Note importance of gradual return to participation with load and volume monitoring under guidance of physical therapist, MD, athletic trainer and coach - Avoid premature or too rapid full return to sport (usually not before 6 months post op)
Emphasize	- Return to participation - Collaboration with Sports Performance experts
Assessment	- LEFS, IKDC, SANE, ACL RSI, NPRS - Swelling - LE AROM and PROM - Balance testing, e.g. Star Excursion Test, Biodex Balance SystemTM - Quadriceps isometrics or isokinetic testing - Functional and Return to Sport tests, e.g. hop testing, QMA – Quality of Movement Testing
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 - Progressive running program. No sprints until 6 months - Progression of agility work - Increase cardiovascular load to match that of desired activity - Collaborate with ATC, performance coach/strength and conditioning coach, skills coach and/or personal trainer to monitor load and volume as return to participation - Consult with referring MD on timing return to sport including any recommended limitations
Criteria for Return to Sport	- Quantitative assessments = 90% of contralateral lower extremity - Movement patterns, functional strength, flexibility, motion, endurance, power, deceleration and accuracy to meet demands of sport