Quad/Patellar Tendon Repair Protocol

PT appointments begin 3–5 days after surgery, and then approx. 1–2/week.

Phase 1: Immediate Post-Op (Weeks 0–2)	
Rehabilitation Goals	• Decrease joint effusion • Protect repair • Knee ext ROM>/= 0 • Gradually improve knee flexion ROM • Quad set with visible quad activity and superior patellar glide • Non-antalgic gait pattern
Precautions and Edu	• WBAT brace locked in extension • Flexion ROM <60 degrees • No active knee extension
Interventions	• **Modalities:** cryo-pneumatic compression (game ready), IFC/Premod, adjust brace (teach self) • **MT/PROM:** STM/edema massage, ext with overpressure, patellar mobs • **ROM/mobility:** Heel slides, hamstring stretch, gastroc stretch, LLLD heel prop • **Gait:** step through pattern • **Neuromotor:** Quad set, SLR 4 ways (standing > on table), prone/standing hamstring curl, standing TKE, heel raises, weight shifting/narrow stance/tandem stance • **NMES:** Biphasic or Russian (consider home unit) • **BFR:** in the absence of significant effusion/edema, bruising, concern for DVT (use with NMES)
Progression Criteria	• </=3+ knee joint effusion via stroke test • Knee extension ROM >/= -5 degrees • Knee flexion ROM= 60 degrees • Normal patellar mobility, superior glide with quad contraction • Pt ambulating with least restricted AD/brace with min gait deviations • SLR with min quad lag at most

Phase 2: Early Rehab (Weeks 2–6)	
Rehabilitation Goals	• Continue to decrease joint effusion • Progress active and passive TKE • Progress knee flexion ROM • No quad lag during SLR • Initiate open chain quad exercise • Discharge Crutches, unlocked brace for ambulation
Precautions and Edu	• Maintain WBAT brace locked in extension, unlock brace for ambulation 1-2 weeks prior to discharge • Progress flexion ROM 10 degrees/week </=90 degrees until 6 weeks post-op

Interventions	• **Modalities/MT:** per patient need, minimize effusion/ecchymosis
	• **Therex:**
	  • Bike rocking, wall heel slides, manual OP emphasis on extension
	  • Quad set towel under heel, TKE strap stretch, TKE ball wall > w/strap, standing TKE band resistance
	  • Open chain: Multiangle quad isometrics at 4-weeks > SAQ/LAQ at 6-weeks
	  • Straight leg bridge, bridge, clamshell, hollow body holds, front plank > alt hip ext, banded side steps
	  • Hip hinge > RDL > SLRDL, SL heel raises
	  • SLS, foam pad, catch/throw during LE activity, cognitive challenges
	• **Conditioning:** UBE or arms only Aerodyne

Phase 2: Early Rehab (Weeks 2–6) (continued)	
Progression Criteria	• <2+ knee joint effusion • Knee extension PROM >/= 0 • Knee flexion ROM = 90 degrees • Minimal gait deviations brace unlocked • Consistent SLR/LAQ without quad lag • Min-mod pain/limitations with functional activities/PT interventions

Phase 3: (Weeks 6–10)	
Rehabilitation Goals	• Progress knee flexion ROM • Wean out of brace • Normalize Gait pattern, assess stair ambulation • Assess knee strength • Progress open chain exercises • Initiate closed chain exercises
Precautions	• Gradual progression of anterior knee loading in open and closed chain

Interventions	• **Modalities/MT:** per patient need, encourage less reliance on cryotherapy and other passive modalities
	• **Gait/Balance:** circle/cone/hurdle walking, light sled push (bend and extend), side stepping, turning
	• **Therex:**
	  • Bike full revolutions, prone quad stretch, foot on step stretch
	  • Wall squat/sit, high box squat, dead lift from box, step up ant/lat, lat heel tap > ant, weighted sled push
	  • Bridge hamstring curl, LAQ w/resistance
	  • Plank on bosu/physioball, dead bug variations, side plank, monster walks, paloff press/cable chop variations
	• **Conditioning:** stationary bike/aerodyne intervals

Progression Criteria	• </=1+ knee joint effusion with progressions made • Passive knee ext WNL, active TKE nearing normal • Flexion ROM>/= 90% contralateral limb • Quad/hamstring strength>/= 3+/5 • No gait deviations • Min difficulty/pain with ADLs (including stairs)

Phase 4: (Weeks 10–16)	
Rehabilitation Goals	• Collaborate with orthopedic team if significant ROM deficits/joint effusion persists • Progress quad/hamstring strengthening • Progress aerobic conditioning • Involve gym program/strength and conditioning specialist • Progress to controlled frontal/transverse/multiplanar loading • Prepare patient for plyometric activities
Precautions	• No impact activities until 4 months post-op

Interventions	• **Modalities/MT:** majority of passive modalities should be discontinued by this phase
	• **Gait/Balance:**
	  • Walking w/catch+pass or dribble, high hurdles, hurdles on foam beam, hurdles/beam with catch+pass
	  • Bosu balance > mini squat > step up, foam pad 3-way hip, SL RDL cone tap, SL RDL on pad
	• **Therex:**
	  • Kneel flx stretch, quadruped/prayer stretch variations, kneeling on pad, half kneeling DF stretch
	  • Box squat, air squat, kickstand squat, pistol squat, single leg wall squat, leg press, single leg press, weighted step ups, ant heel taps, sled pull, nordic hamstring curl BFR leg press/weight bearing
	• **Conditioning:** swimming, elliptical, stair master

Phase 4: (Weeks 10–16) (continued)	
Progression Criteria	• Trace knee joint effusion with progressions made • Normalize PROM flx/ext • Normalize TKE AROM • Quad/hamstring strength >/=4/5 (LSI>/= 70%) • No difficulty with ADLs (including stairs)

Phase 5: (Months 4–6)	
Rehabilitation Goals	• Continue to progress quadriceps/hamstring strength • Introduce sagittal plane plyometrics • Introduce jogging/running • Prepare patient for interval running program • Initiate jump/hop testing
Criteria for Plyometrics	• ROM WNL • Trace effusion at most • Min anterior knee pain with loading • **Strength:** Symmetrical squat/lunge, 10x shrimp squats to at least 60 degrees, 10x ant heel tap on 6-8" with minimal compensatory patterns
PWB Plyometrics	• Single plane and PWB (on shuttle or with band assistance) • </= 100 foot contacts initially • 1-2 sessions per week, 5-10% progression of foot contacts per week
Sagittal Plyometrics	• PWB > box jump up > box jump down > 2 to 1 box jump > in place jumps > scissor hops > in place jog > line jumps > line hops > single leg box jumps > squat jumps > sagittal plane ladder drills > jogging
Frontal Plane Plyometrics	• PWB > lateral box jumps > single leg lateral box jumps > lateral line jumps > lateral line hops > Frontal plane ladder drills > lateral shuffling
Hop Testing	• Single hop for distance, triple hop for distance, crossover hop for distance, 6m hop for time
Progression Criteria	• No effusion with progressions made • Good tolerance and performance of plyometric activities • Good tolerance and performance of jogging/running • >/= 70% hop testing LSI • Quad/hamstring strength>/= 4+/5 (LSI>/=80%)

Phase 6: (6+ months)	
Rehabilitation Goals	• Continue to progress quadriceps/hamstring strength • Initiate interval running program • Initiate cutting/pivoting/agility • Initiate sprinting • Transition to self-management/strength and conditioning
Return to Run	• 1 mile ~1500 foot contacts, initiate interval program once pt demonstrates tolerance to this foot contact volume as well as 30-minute walk without pain/effusion • Further clearance via metronome set to 60-90BPM, complete heel tap to this cadence • Cue against asymmetrical running pattern due to decreased load acceptance (decreased knee flexion angle) on affected limb • See return to run protocol for volume progression
Agility	• Change of direction, multiplanar movements, cutting, pivoting • Progress to multiplanar ladder drills and cone drills • Reaction activities, buddy exercises, sport specific drills • Track progress with T-drill and 5-10-5

Phase 6: (6+ months) (continued)	
Sprinting	• See return to sprinting protocol
Progression Criteria	• No effusion with progressions made • Good tolerance and performance of interval running program • Good tolerance and performance of agility exercises • Good tolerance and performance of interval sprinting program • Hop testing LSI>/= 85% • Quad/hamstring strength LSI>/=85% • ACL RSI>/=60% at 6 months
Return to Sport Criteria	• Quadriceps/hamstring strength LSI 90-100% • Hop testing LSI 90-100% • Restore pre-injury conditioning/performance • Return to sport specific activities- non-contact practice, full practice, full play