Rehabilitation Protocol for Non-Operative Management of ACL Injuries

This protocol is intended to guide clinicians through the non-operative course for ACL injuries. This protocol is time based as well as criterion based. Specific intervention should be based on the needs of the individual and should consider exam findings and clinical decision making. The timeframes for expected outcomes contained within this guideline may vary based on physician's preference, concomitant injuries, and/or complications. If a clinician requires assistance in the progression of a patient, they should consult with the referring provider.

The interventions included within this protocol are not intended to be an inclusive list of exercises. Therapeutic interventions should be included and modified based on the progress of the patient and under the discretion of the clinician.

PHASE I: IMMEDIATE POST-INJURY (0-2 WEEKS)

Rehabilitation Goals	• Reduce swelling, minimize pain • Restore full extension, gradually improve flexion • Minimize arthrogenic muscle inhibition, re-establish quad control, regain full active extension • Patient education • Keep your knee straight and elevated when sitting or laying down. Do not rest with a towel placed under the knee
Weight Bearing	*Walking* • Initially brace locked, crutches • May start walking without crutches as long as there is no increased pain ○ Allograft and hamstring autograft continue partial weight bearing with crutches for 6 weeks unless otherwise instructed by MD • May unlock brace once able to perform straight leg raise without lag • May discontinue use of brace after 6 wks per MD and once adequate quad control is achieved When climbing stairs, make sure you are leading with the non-surgical side when going up the stairs, make sure you are leading with the crutches and surgical side when going down the stairs *Precautions* • Activities that result in continued locking of the knee • Activities that result in continued episodes of giving way • Continued/worsening of pain and/or edema with progressed physical therapy
Interventions	*Swelling Management* • Ice, compression, elevation (check with MD re: cold therapy) • Retrograde massage • Ankle pumps *Range of motion/Mobility* • Patellar mobilizations: superior/inferior and medial/lateral ○ ***Patellar mobilizations are heavily emphasized in the early post-operative phase following patella tendon autograft*** • Seated assisted knee flexion extension and heel slides with towel • Low intensity, long duration extension stretches: prone hang, heel prop • Standing gastroc stretch and soleus stretch • Supine active hamstring stretch and supine passive hamstring stretch *Strengthening* • Calf raises • Quad sets

	• NMES high intensity (2500 Hz, 75 bursts) supine knee extended 10 sec/50 sec, 10 contractions, 2x/wk during sessions—use of clinical stimulator during session, consider home units distributed immediate post op • Straight leg raise • Hip abduction Multi-angle isometrics 90 and 60 deg knee extension
Criteria to Progress	• Full knee ROM • Quad contraction with superior patella glide and full active extension • Able to perform straight leg raise without lag • Able to perform SL balance on affected limb > 30 sec • Edema and pain well managed

PHASE II: INTERMEDIATE (3-5 WEEKS)

Rehabilitation Goals	• Maintain ROM and flexibility • Restore muscle strength • Increase proprioception and neuromuscular responses • Restore normal gait with stair climbing • Eliminate instability
Additional Intervention **Continue with Phase I interventions*	*Range of motion/Mobility* • Stationary bicycle • Gentle stretching all muscle groups: prone quad stretch, standing quad stretch, kneeling hip flexor stretch *Strengthening* • Standing hamstring curls • Step ups and step ups with march • Partial squat exercise • Ball squats, wall slides, mini squats from 0-60 deg • Lumbopelvic strengthening: bridge & unilateral bridge, sidelying hip external rotation-clamshell, bridges on physioball, bridge on physioball with roll-in, bridge on physioball alternating, hip hike *Balance/proprioception* • Single leg standing balance (knee slightly flexed) static progressed to dynamic and level progressed to unsteady surface • Lateral step-overs Joint position re-training
Criteria to Progress	• Tolerance of Phase II exercises without adverse events or swelling • Sufficient strength to initiate agility activities as indicated by: >80% 1RM Leg Press of uninvolved leg*** • Sufficient proprioception to initiate agility activities as indicated by: Y Balance Test Composite Score >= 90% of unaffected side • No signs of active inflammation • No episodes of instability

PHASE III: LATE/CHRONIC (6-8 WEEKS)

Rehabilitation Goals	• Progressive strengthening • Maintain ROM and flexibility • Restore neuromuscular responses with plyometrics and advanced proprioceptive exercises • Return to running

Additional Intervention **Continue with Phase I-II Interventions*	• Continue to increase intensity of proprioceptive training from Phase II • Exercises to add for progressive agility training: • Lateral shuffle (distance changes to inc or dec COD) • Cariocas • Cone drills (figure 8, forward/backward running, T-Test)
Criteria to Progress	• Completion jog/run program without pain/effusion / swelling

PHASE IV: UNRESTRICTED RETURN TO SPORT (8-12+ WEEKS)

Rehabilitation Goals	• Progressive strengthening • Maintain ROM and flexibility • Safe return to work and/or sport activities (with MD clearance if applicable) • Quadriceps and hamstring strength to >90% of uninvolved leg per isokinetic strength test (if available) • Single leg hop tests >90% of uninvolved leg • Patient education regarding potential limitations and activity modifications • Patient education regarding sports bracing if applicable • Patient education regarding maintaining healthy BMI
Additional Intervention **Continue with Phase II-V interventions*	• Continue to progress strengthening exercises with increasing resistance assuming proper form and technique • Advance Phase III plyometric training to single leg • Advance agility training to sport-specific movements at competition speed • Progress aerobic and metabolic conditioning appropriate for sport

Criteria to Discharge	• Clearance from MD and ALL milestone criteria below have been met
	• Functional Assessment
	  ○ Quad/HS/glut index ≥90%; HHD mean or isokinetic testing @ 60d/s
	  ○ Hamstring/Quad ratio ≥66%
	  ○ Hop Testing ≥90% compared to contra lateral side, demonstrating good landing mechanics
	• KOOS-sports questionnaire >90%
	• International Knee Committee Subjective Knee Evaluation >93

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Contact	Please email MGHSportsPhysicalTherapy@partners.org with questions specific to this protocol

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