ACL CLINICAL PRACTICE GUIDELINE

Summary of Recommendations

Precautions	● No testing of repaired or reconstructed ligaments prior to 12 weeks ● No isotonic resisted hamstring exercises for 8 weeks with hamstring autograft ● No loaded open kinetic chain knee extension beyond 45 degrees for 8 WEEKS ● Meniscus Repair: ○ No weight-bearing (WB) therapeutic exercise >90º x *8 WEEKS* ○ PWB x4 WEEKS ○ No forced flexion beyond 90º x4 WEEKS
Strength Testing	● Isometric testing anytime- fixed at 90º ● Isokinetic testing no earlier than 12 weeks
Criteria to Discharge Assistive Device	● ROM: Full active knee extension; no pain on passive overpressure ● Strength: Able to perform strong quad isometric with full tetany and superior patellar glide and able to perform 2x10 SLR without quad lag ● Effusion: 1+ or less is preferred (2+ acceptable if all other criteria are met) ● Weight Bearing: Demonstrates pain-free ambulation without visible gait deviation
Criteria to Initiate Running and Jumping	● ROM: full, pain-free knee ROM, symmetrical with the uninvolved limb ● Strength: Isokinetic testing 80% or greater for hamstring and quad at 60º/sec and 300º/sec ● Effusion: 1+ or less ● Weight Bearing: normalized gait and jogging mechanics ● Neuromuscular Control: Pain-free hopping in place
Criteria for Return to Sport	● ROM: full, painfree knee ROM, symmetrical with the uninvolved limb ● Strength: Isokinetic testing 90% or greater for hamstring and quad at 60º/sec and 300º/sec ● Effusion: No reactive effusion ≥ 1+ with sport-specific activity ● Weight Bearing: normalized gait and jogging mechanics ● Neuromuscular control: appropriate mechanics and force attenuation strategies with high level agility, plyometrics, and high impact movements ● Functional Hop Testing: LSI 90% or greater for all tests ● Physician Clearance

Early Post-Operative Phase (Post-ACLR - 4 weeks)

Appointments	• Post-operative evaluation should be performed 3-5 days following surgery. Follow-up appointments 1-2x per week, depending on progression towards goals.
Precautions	• No testing of repaired or reconstructed ligaments prior to 12 weeks • No loaded open kinetic chain knee extension for 8 WEEKS • Meniscus Repair: ○ No weight-bearing (WB) therapeutic exercise >90º x *8 WEEKS* ○ PWB x4 WEEKS ○ No forced flexion beyond 90º x4 WEEKS
Pain and Effusion	• ≥ 2+ (using Modified Stroke Test) • Cryotherapy and compression (ie. Donut, ace wrap, limited WB therapeutic exercise)
ROM	• Extension: Emphasis on achieving full knee extension immediately following surgery. If full extensions not achieved by 4 weeks, contact surgeon regarding ROM concerns. • Flexion: No forced flexion past 90º for meniscus repairs. ACLR and meniscectomy are able to push for symmetrical flexion as appropriate.
Therapeutic Exercise	• Emphasis on quad activation without gluteal co-contraction • Restore patellar mobility • Symmetrical ROM • Decrease effusion • Ambulation with appropriate joint loading and without obvious gait deviation
Suggested Interventions	• Extension ROM: bag hangs or prone hangs • Flexion ROM: heel slides, wall slides, upright bike • Patellar mobilization: superior, inferior, medial, lateral • Quad Isometrics; SLR 4-way • TKE: prone and standing • LAQ • Weight shifting, SL balance • Neuromuscular re-education using electrical stimulation (NMES) at 60º knee flexion
Criteria to Discharge Assistive Device	• ROM: Full active knee extension; no pain on passive overpressure • Strength: Able to perform strong quad isometric with full tetany and superior patellar glide and able to perform 2x10 SLR without quad lag • Effusion: 1+ or less is preferred (2+ acceptable if all other criteria are met) • Weight Bearing: Demonstrates pain-free ambulation without visible gait deviation
Criteria to Progress	• ROM: ≥ 0-120 degrees • Strength: Quadriceps set with normal superior patellar translation, SLR x 10 seconds without extensor lag • **Goals: (These do not limit progression to next phase; however, should be addressed with interventions)** • Effusion: 2+ or less with Modified stroke test

Middle Phase of Rehabilitation (4-12 weeks)

Appointments	• Goal to increase lower extremity strength. 1-2 visits per week with emphasis on patient compliance with resistance training as part of HEP (2-3 days per week outside of therapy).

Precautions	• Open Chain knee extension:
	  ○ Initiate submaximal leg extension 90-45 degrees
	  ○ Initiate active knee ROM 90-0 degrees (modify if painful)
	• No isolated resisted hamstrings strengthening until 8 weeks

Pain and Effusion	• Cryotherapy/compression as needed for reactive effusion. • Patellar taping to reduce PF symptoms if present
ROM	• Monitor and progress knee ROM, patellar mobility, and LE flexibility • Begin more aggressive techniques to achieve/maintain full knee extension (i.e. weighted bag hang) as needed • Continue bike for ROM and warm up • If full AROM knee extension is not achieved by 4 weeks, contact surgeon regarding ROM concerns.

Suggested Interventions and Timelines	• Multi-angle knee isometrics from 60-90º for patients unable to tolerate high-intensity NMES • Initiate open chain knee extension exercises
	  ○ Unweighted full range LAQ
	  ○ Protected range with isotonic progression
	• Progress WB quadriceps and hamstring exercises with emphasis on proper LE mechanics (no isolated HS strengthening until 8 weeks)
	• Progress gluteal and lumbopelvic strength and stability
	• Progress single leg balance
	• Endurance: low impact - treadmill walking, stepper, elliptical (6 weeks) • Initiate PWB plyometrics on shuttle (8-10 weeks, see precautions to begin full WB plyometrics)
	• NMES

Criteria to Initiate Running and Jumping	• ROM: full, pain-free knee ROM, symmetrical with the uninvolved limb • Strength: Isokinetic testing 80% or greater for hamstring and quad at 60º/sec and 300º/sec • Effusion: 1+ or less • Weight Bearing: normalized gait and jogging mechanics • Neuromuscular Control: Pain-free hopping in place
Criteria to Progress	• ROM: Maintain full, pain free AROM including PF mobility • Effusion: 1+ or less • Strength: Isometric or isokinetic quadriceps and hamstrings strength >/= 80% 4. Weight Bearing: Able to tolerate therapeutic exercise program, including jogging progression, without increased pain or >1+ effusion • Neuromuscular Control: Demonstrates proper lower extremity mechanics with all therapeutic exercises (bilaterally)

Late Phase of Rehabilitation (weeks 12-Return to Sport)

Appointments	• Increased frequency from previous stage to 1-2x per week when appropriate to initiate

	plyometric training and return to running program.
Precautions	● Criteria to initiate hopping ○ Full, pain free ROM ○ ≤ 1+ effusion ○ ≥ 80% isometric strength symmetry (hamstrings and quadriceps) OR 20 heel touches on 8 inch step with good mechanics ● Criteria to initiate jogging (in addition to above criteria) ○ Hop downs with appropriate landing mechanics ○ Audible rhythmic strike patterns and no gross visual compensation
Pain and Effusion	● Effusion may increase with increased activity, ≤1+ and/or non-reactive effusion for progression of plyometrics
ROM	● Full, symmetrical to contralateral limb, and painfree with overpressure
Therapeutic Exercise	● Performance of the quadriceps, hamstrings and trunk dynamic stability ● Muscle power generation and absorption via plyometrics ● Sport- and position-specific activities ● Begin agility exercises between 50-75% effort (utilize visual feedback to improve mechanics as needed) ● Advance plyometrics: Bilateral to single leg, progress by altering surfaces, adding ball toss, 3D rotations, etc.
Suggested Interventions	● Therapeutic Exercise/Neuromuscular Re-education ○ Squats, leg extension, leg curl, leg press, deadlifts, lunges (multi-direction), crunches, rotational trunk exercises on static and dynamic surfaces, monster walks, PWB to FWB jumping ○ Single-leg squats on BOSU with manual perturbation to trunk or legs, Single-leg BOSU balance, single-leg BOSU Romanian deadlift ● Agility ○ Side shuffling, Carioca, Figure 8, Zig-zags, Resisted jogging (Sports Cord) in straight planes, backpedaling ● Plyometrics ○ Single-leg hop downs from increasing height (up to 12" box), Single-leg hop-holds, Double and single-leg hopping onto unstable surface, Double and single-leg jump-turns, Repeated tuck jumps
Criteria for Return to Sport	● ROM: full, pain free knee ROM, symmetrical with the uninvolved limb ● Strength: Isokinetic testing 90% or greater for hamstring and quad at 60º/sec and 300º/sec ● Effusion: No reactive effusion ≥ 1+ with sport-specific activity ● Weight Bearing: normalized gait and jogging mechanics ● Neuromuscular control: appropriate mechanics and force attenuation strategies with high level agility, plyometrics, and high impact movements ● Functional Hop Testing: LSI 90% or greater for all tests ● Physician Clearance