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Accelerated ACL Reconstruction Rehabilitation Protocol (Autograft Only)

PHASE 0:	Pre-Operative Recommendations
GOALS:	Full ROM Minimize Joint Effusion Increase Quadriceps strength (quad sets, leg press, body weight squats, etc) [1,2] Perturbation training [1,2,3,4] (Rocker Board: A/P/M/L) DBL → SL

PHASE I:	Generally post-operative weeks 1 - 4
PRECAUTIONS:	*Wear long-legged ROM brace at all times for 3 weeks, except during rehabilitation*[19] ***NO** running until 3 months post-op**
CRUTCHES:	WBAT w/ crutches starting Day 1 [5] D/C crutches when gait is normal
BRACE & ROM:	Brace locked at 0° extension for ambulation for 1-2 weeks; then, open to current ROM [26] ROM: Diligently work to obtain full extension and ~90° flexion by 1 week post-op
WOUND:	Post-op dressing remains intact until post-op day #3 (~48 hours after surgery) May begin showering after post-op day #3 (no need to cover incision site) ***Do NOT** submerge knee in tub or pool for 4 weeks* Suture/staple removal @ 10-14 days at followup with Dr. Zacchilli.
REHABILITATION:	Frequent use of cryocuff and/or ice with lower extremity elevated [10,13,14] Exercises should be done as part of a home exercise program 2-3 x per day
~Week 1	Calf pumping (using theraband) Assisted heel slides or supine wall slides Quad sets (with e-stim) [5,7] SLR [6]
~Week 2	Supine passive extension with ice on knee and towel under heel Gentle hamstring stretching SLRs: front direction – progressively add weight as quad control increases Discontinue e-stim when quality SLRs are performed Hip Abduction wall slides - (hip abduction strengthening) Stationary bike for ROM ↻↺ half circles - progress to biking for conditioning
~Weeks 3-4	Step-ups (0-60deg) in pain-free range[9] Heel raise progression: begin bilateral heel raises - progress to unilateral Double leg mini-squats (0-45°) - progress to single leg

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	Eccentric Leg Press (20-60°) [24,25] Gait training (cone walking, marching, retrowalking, cariocas, shuffles, etc.) Forward, lateral, and retro step-ups (start with 4", progress as tolerated) LAQ (90-45°)[27,28,29,30] Resistance can be increased for BTB. **No Resistance** until wk 12 for <u>HS graft</u>
FOLLOW-UP:	Physical Therapy: Bimonthly; Ortho: ~4-6 weeks post-op; Supervised rehabilitation: 2-3 x per week as needed
DOCUMENTATION:	Precautions, pain level, medications and modalities Observation: (incision sites) - Signs/symptoms of infection? Site healing well? Effusion? Neurovascular status: Distal pulses, motor and sensation intact? Presence of calf pain? Knee ROM, quadriceps function, & gait
	E-Stim: High-intensity setting (2500-Hz alternating current at 75 burst per second, 2 to 3 times per week for 3-12 weeks, for 10-15 seconds on with 50 seconds of rest [16,17,18]
PHASE I GOALS:	Normal gait and stair ambulation ROM: Full knee extension 1-2wks, Full knee flexion 4-5wks [11] (If goals are not met, consider remaining on phase I for 2 additional weeks)

PHASE II:	**Generally post-operative months 2 - 3**
PRECAUTIONS:	*Continue to wear brace in compromising environments (i.e., crowds, bad weather, etc.)* ***<u>NO</u>** running until 3 months post-op*
BRACE:	Optional - fit with an off-the-shelf ACL sports brace or a hinged sleeve knee brace when effusion is minimal (typically between 6-8 weeks post-op) Evidence encourages NO BRACE [20]
REHABILITATION:	Continue phase I exercises as needed Progress to the following exercises and increase intensity gradually when patient is ready (i.e., no increase in knee pain or effusion since the previous exercise session) *Note: all strengthening should be done starting with low weights, high repetitions, and in a painless ROM*
~Month 2	Stationary biking for conditioning (~80-100 RPMs) - may add elliptical gradually General LE stretching (calf, HS, quads, HF, hip adductors) Progressive standing balance exercises (body blade, plyoball, platform training, etc.) (progress in duration, intensity, double leg to single leg, etc.)

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	Progressive strengthening (calf raises, eccentric leg press (0-60°)[24,25], squats (0-45°), lunges, hip abd/add, HS curls for BTB graft only) **No HS curls for HS graft** (first set: 20 repetitions, then 2 additional sets at the same weight to muscle failure) Progressive aquatics program (optional)
~Month 3	Elliptical and/or stairmaster Progressive functional training (2 legged plyometrics, jump roping, etc.)[23] Progressive strengthening (calf & leg press, squats (0-60°), lunges, HS curls, hip abd/add[32]) (first set: 15 repetitions, then 2 additional sets at the same weight to muscle failure) LAQ (10-90°) [8,15]
FOLLOW-UP:	PT: ~every 3-4 weeks; Ortho: ~3 months post-op Supervised rehabilitation: 2-3 x per week as needed
DOCUMENTATION:	Precautions, pain level, medications, modalities Effusion, knee ROM, quadriceps function, lachman/pivot shift, & gait
PHASE II GOALS:	Full knee ROM with minimal or no effusion Hop without pain using good form (If goals are not met, consider remaining on phase II for 2-4 additional weeks)

PHASE III:	**Generally post-operative months 4 - 6**
PRECAUTIONS:	*<u>**NO**</u> participation in sports or advanced physical training*
BRACE:	No brace[20] unless required under Ortho's guidance.
REHABILITATION:	Continue other phase II exercises as needed Progress in duration and intensity of exercise only if there is no increase in knee pain or effusion since the previous exercise session.
~Month 4	Warm-up: 5-10 minutes (bike, elliptical, stairmaster) General LE stretching: 5-10 minutes (calf, HS, quads, HF, hip adductors) Progressive strengthening (calf & leg press, squats (0-90°), lunges, HS curls, hip abd/add) (first set: 10 repetitions, then 2 additional sets at the same weight to muscle failure) Progressive balance training1,2,3,4 Progressive functional training: Begin at 25-50% intensity and progress gradually (jumping, hopping, directional jogging, cariocas, shuffles, agility ladders, etc.) Walk to run progression program (on a treadmill)

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~Months 5-6	Warm-up: 5-10 minutes (bike, elliptical, stairmaster) General LE stretching: 5-10 minutes (calf, HS, quads, HF, hip adductors) Progressive strengthening (calf & leg press, squats (0-90°), lunges, HS curls, hip abd/add) (first set: 6-8 repetitions, then 2 additional sets at the same weight to muscle failure) Progressive balance training as needed Continue running progression Progressive functional training: Begin at 50-75% intensity and progress gradually (jumping, hopping, directional jogging, cariocas, shuffles, agility ladders, etc.) Functional knee program I & II (optional)
FOLLOW-UP:	PT: Monthly; Ortho: ~6 months post-op; Supervised rehab: 1-2 x per week as needed
DOCUMENTATION:	Pain level, medications, modalities Effusion, knee ROM, quadriceps function, lachman/pivot shift, hop for distance
PHASE III GOALS:	Agility running and cutting at 50-75% intensity without pain, Hop for distance > 90% compared to uninvolved side Strength return of > 90% for quadriceps and hamstring compared to uninvolved side (If goals are not met, consider remaining on phase III for 1-3 additional months)
MISCELLANEOUS:	After 6 months post-op: Exercises in phase III are continued, gradually increasing intensity & duration as tolerated. Individual sport specific drills are initiated as applicable. The recommendation is to wait until 9-12 months[12] post-op to return to contact/collision sports or aggressive physical training (e.g. CrossFit, etc.). This time period may be adjusted slightly by the surgeon and therapist according to patient progress. ACL-Return to Sport after Injury (ACL-RSI) screening tool[22]

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