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ACLR Rehabilitation

Recommended Frequency: 1-3 visits/wk **Total Duration: 4-6 Months**

These guidelines, treatments, and milestones have been established to assist in guiding rehabilitation based on the most current available evidence. They are not intended to be substitute for sound clinical judgement with consideration of the individual contextual features of the patient and the demands of various functions/sports.

Pre-operative goals: Full knee extension range of motion (ROM), absent or minimal joint swelling, no knee extension lag with straight leg raise (SLR), educate the patient on what to expect following surgery, and protect the joint.

Timeline	Milestones	Treatment Recommendations
Week 1 (Day 0-7)	-AROM/PROM=0-90º -Recommended not emphasizing hyperextension equal to contralateral side, as patient should achieve this over time -Active Quadriceps contraction with superior patellar glide	• Wall Slides • Patellar Mobilization • Gait training • Stationary bike for ROM Home program • Self-applied ROM • Self-Patellar mobilizations • Quad sets • Long Arc quads (90-30º Flexion) • SLR (may use electrical stimulation to assist with quad activation)
Week 2 (Day 7-14)	• Flexion > 110 • Gait without crutches • Use of bike without difficulty • Walking with full extension • Reciprocal Stair climbing (with handrail use) • Maintain Knee extension of 0º • Double limb sit to stand from 17" seat	• Steps up in pain free ROM • Scar mobilizations when skin is healed • Wall Squats/ sits • Prone hangs or bag hangs for full extension ROM (if not already achieved) • Patellar mobilizations in flexion (if flexion ROM limited)
Weeks 3-5 (Day 14-35)	• Flexion within 10º of contralateral • Reciprocal stair climbing (without handrail use)	• Patellar &/or tibiofemoral mobilizations (as appropriate) • Progress bike and stair master duration to 10-minute minimum

	• Quad Strength 4+/5 or greater (Test @ 45° flexion) • Maintain Knee extension of 0° • Within one SD of 5x sit to stand test norm for age group	• Begin balance and proprioception
Weeks 6-8 (Day 35-56)	• Normalized gait pattern • Full ROM compared to contralateral (recommend not emphasizing hyperextension) • No greater than 1+ effusion using the stroke test • 5X sit to stand: normal value for age group • ≤ 2 errors on SL squat	• Progressive resistive exercises • Begin running progression on treadmill (progression based on the Soreness Rules)
Weeks 9-12 (day 56-84)	• Hops test >85% • Maintain ROM • Trace to Zero effusion grade using the stroke test • ≤ 1 errors on SL squat (week 10) • Zero errors on SL squat (week 12)	• Sport specific exercises • Agility activities • Functional testing • Closed chain core strengthening • Running progression
Week 13- Return to sport	• All hop test symmetry > 90% • Modified Star Excursion balance test symmetry ≤ 4 cm • Acute to chronic workload ratio < 1.5	• Sport specific exercises • Agility activities • Functional testing • Closed chain core strengthening • Running progression
Follow up Functional testing	• 4,5,6,and 12-month Post-Op testing • Progression towards power activities as needed	• Maintain gains in strength • Hop tests(90-100% of contralateral) • Maintain ROM

Precautions/Additional information

Graft protection:

- Brace use and graft type are at the discretion of the surgeon.
- Stress to ACL with passive ROM 0-120^0 is minimal. Most strain occurs in last 30^0 of NWB extension

Adjunct treatments:

- NMES may be instrumental in improving muscular performance for those not responding to traditional strengthening.
- If concomitant injury present at the same time, that injury dictates rehab progression:
    - meniscal injury with repair:
        - Full PROM is allowed. Ambulate WBAT with brace locked at 0° until week 5

        - No loaded knee flexion beyond 45° until week 5, none beyond 90° until week 8
        - No forced knee hyperextension if anterior horn repair /No forced knee flexion if posterior horn repair
        - Avoid OKC exercise from 0-30° and CKC exercise from 90-120° if patient shows signs/symptoms of patellofemoral irritation
    - chondral damage: restrict WB for 3-4 weeks to avoid stressing the healing cartilage. Beware that prolonged weight bearing restriction may result in difficulty recovering ROM and quad activation.
    - partial meniscectomy: no modification of guideline (symptom management)
    - MCL: If surgical repair, avoid directly stressing the MCL, and consider sagittal plane limitations if needed.
    - PCL: follow PCL guidelines

Treatment Progression/Success:

- Factors that can impact rehabilitation success include the following: psychosocial issues, motivation, swelling, quad activation failure, acute reconstruction21, involvement of other structures.
- Success measured by: 1. Less than mild effusion, 2. >90% hamstring and 3. quad strength, 4. Absence of giving way episodes, 5. Participation in 1-2 seasons of sports at previous activity level, 6. Patient reported outcomes.
- Patient Reported Outcome Measure: Consider using SANE score, as it correlates well with Cincinnati Knee Rating System.
- Consider using Stoke Test Grading for Effusion to determine whether to progress. Use this tool to assist with grading activity. *I.e. - increased effusion by 2 grades would lead to a decrease in activity until the effusion decreases to the previous level*.
- Weight bearing exercises alone are not enough for optimal outcomes. Graded increases in load, appropriate to the phase of healing, should be considered.