

Quad Tendon ACL Reconstruction PT Protocol

The following protocol has been designed as a guideline for rehabilitation after ACL reconstruction with a quadriceps autograft. Progression from one phase to the next is based on the patient demonstrating readiness by achieving **functional criteria rather than the time elapsed since surgery**. The timeframes identified in parentheses after each Phase are *approximate* times for the average patient, **NOT** guidelines for progression.

Pre-op Requirements: Normal gait mechanics
 AROM 120° flexion
 Strength: 20 SLR with no lag
 Minimal effusion
 Patient education- post-op expectations and exercises
 Patient education- ambulation with crutches

Phase I: Immediate Post-operative Period (*surgery to 2 weeks*)

- **Goals:**
 - Full knee extension ROM
 - Good quadriceps control (≥ 20 no lag SLR)
 - Minimize pain & swelling
 - Normal gait pattern
- **Weightbearing:** WBAT with crutches
- **Bracing:** None (Exception: First 24 hours depending on the nerve block)
- **Cryotherapy:** Cold with compression/elevation
 - First 24 hours or until acute inflammation is controlled: every hour for 15 min.
 - After acute inflammation is controlled: 3x a day for 15 min
- **Range of Motion:** Low load, long duration (~ 5min) stretching
 - Extension: Heel prop, prone hangs
 - Flexion: Wall slides, heel slides, drop & dangles with assisted flexion, bike rocks
 - Quad incision may limit flexion until healed, use caution not to overdo it
 - Patellar mobilization: med/lat initially, can advance to sup/inf once effusion is decreased
- **Therapeutic Exercises**
 - Quad sets: emphasizing VL & VM activation
 - SLR emphasizing no lag
 - E-stim can be used to stimulate quads if unable to perform 20 no lag SLR
 - Closed chain: double-leg $\frac{1}{4}$ squats, standing theraband TKE, stool scoots
 - Prone: HS sets, HS curls, hip extension
 - Side-lying hip AB/AD (avoid AD with concomitant MCL injury)
 - Ankle pumps & heel raises
- **CRITERIA FOR PROGRESSION TO PHASE 2**
 - 20 no lag SLR

- Normal gait
- Crutch/immobilizer D/C
- ROM: no greater than 5° active extension lag, 110° active flexion

Phase II: Early Rehabilitation (*approx. weeks 2-6*)

- **Goals**
 - Full ROM
 - Improve strength
 - Progress neuromuscular retraining
- **Range of Motion** – low load, long duration
 - Heel slides/wall slides
 - Heel prop/prong hang (minimize co-contraction/nociceptor response)
 - Bike: rocking-for-range → riding with low seat height
 - Flexibility stretching for all major groups
- **Therapeutic Exercises**
 - Quads: QS, mini-squats/wall-squats, step-ups, knee ext from 90-40°, leg press/shuttle press w/o jumping
 - HS: curls, resistive SLR with sports cord/TB
 - Hips: AD/AB with SLR/bands, multi-hip machine with proximal resistance
 - Calf raises
 - Neuromuscular training: wobble board, rocker board, single-leg stance w/wo equipment, slide board, fitter
 - Cardiopulmonary: bike, elliptical, stairmaster
- **CRITERIA FOR PROGRESSION TO PHASE 3**
 - Full ROM
 - Minimal effusion/pain
 - Functional strength & control in ADLs
 - IKDC Question #10 (Global Rating of Function) score of ≥7

Phase III: Strengthening & Control (*approx. weeks 7-12*)

- **Goals**
 - Maintain Full ROM
 - Running w/o pain or swelling
 - Hopping w/p pain, swelling or giving-way
- **Strengthening:**
 - Squats & Wall Squats
 - Leg press & Shuttle
 - HS curl
 - Knee ext 90-0°
 - Step-ups/down
 - Lunges
 - Sports cord
- **Neuromuscular training**
 - Wobble board/ rocker board/ roller board
 - Perturbation training

- Varied surfaces
- **Cardiopulmonary**
 - Straight line running on treadmill or in protected environment (NO cutting or pivoting)
 - All other cardiopulmonary equipment
- **CRITERIA FOR PROGRESSION TO PHASE 4**
 - Running w/o pain or swelling
 - Hopping w/p pain or swelling (bilateral AND unilateral)
 - Neuromuscular & strength training exercises w/o difficulty

Phase IV: Advanced Training (*approx. week 13-16*)

- **Goals**
 - Running patterns (Figure-8, pivot drills, etc) at 75% speed w/o difficulty
 - Jumping w/o difficulty
 - Hop tests at 75% contralateral values (Cincinnati hop tests: single-leg hop for distance, triple-hop for distance, crossover hop for distance, 6-meter timed hop)
- **Aggressive Strengthening:**
 - Squats
 - Lunges
 - Plyometrics
- **Agility Drills**
 - Shuffling
 - Hopping
 - Carioca
 - Vertical jumps
 - Running patterns at 50-75% speed (e.g. figure-8)
 - Initial sports specific drill patterns at 50-75% effort
- **Neuromuscular training**
 - Wobble board/ rocker board/ roller board
 - Perturbation training
 - Varied surfaces
- **Cardiopulmonary**
 - Running
 - All other cardiopulmonary equipment
- **CRITERIA FOR PROGRESSION TO PHASE 5**
 - Maximum vertical jump w/o pain or instability
 - 75% of contralateral on hop tests
 - Figure-8 run at 75% speed w/o difficulty
 - IKDC Question # 10 (Global Rating of Knee Function) score of ≥ 8

Phase V: Return-to-Sport (approx. week 17-20)

- **Goals**
 - 85% contralateral strength
 - 85% contralateral on hop tests
 - Sport specific training w/o pain, swelling or difficulty
- **Aggressive Strengthening:**
 - Squats
 - Lunges
 - Plyometrics
- **Sport Specific Activities**
 - Interval training programs
 - Running patterns in football
 - Sprinting
 - Change of direction
 - Pivot & drive in basketball
 - Kicking in soccer
 - Spiking in volleyball
 - Skill/biomechanical analysis with coaches and sports medicine team
- **Return-to-Sport Evaluation Recommendations**
 - Hop tests (single-leg hop, triple hop, cross-over hop, 6 meter timed-hop)
 - Isokinetic strength test (60°/second)
 - Vertical jump
 - Deceleration shuttle test
 - MOON outcomes measure packet (mandatory; should be completed post-testing)
- **RETURN-TO-SPORT CRITERIA**
 - No functional complaints
 - Confidence when running, cutting, jumping at full speed
 - 85% contralateral values on hop tests
 - IKDC Question # 10 (Global Rating of Knee Function) of > 9

This protocol has been adopted from the MOON panel of content experts with the Multicenter Orthopaedics Outcomes Network.