



Anterior Cruciate Ligament (ACL) with Hamstring Tendon Autograft or Allograft Techniques Reconstruction Protocol

Overview:

This protocol is a criteria-based protocol, with a goal of maximizing healing and strength recovery, while minimizing risk of re-injury, so the individual can return to work, sport or recreational activities as quickly and safely as possible. If a clinician requires assistance in the progression of a post-operative patient they should consult with the referring surgeon.

*****This is a summary of a clinical reference protocol, use the link below to view the protocol in its entirety*****

Special Considerations:

- No resisted Hamstring strengthening until weeks 6-8 to allow graft site healing
- Not a candidate for an accelerated Rehabilitation Protocol 2° to slower healing time

Post-Operative Phase I: Approximately day 1 to 14

Goals:

- A/PROM 0-90 degrees
- Control swelling and pain (cryotherapy and electrical stimulation)
- Restore patella mobility
- Restore quadriceps control – active quadriceps contraction
- WBAT with crutches & brace. Discontinue use of crutches **by day 10-14**

Brace/Assistive Device:

- Locked in full extension with bilateral crutches or as directed by MD
- Discontinue brace once voluntary quad control is demonstrated

Treatment:

- Quad sets (NMES to aide in quad control)
- Gastrocnemius/heel cord/hamstring stretching
- Stationary bicycle
- Active and passive knee flexion exercises to tolerance, not pushed **(to 90 degrees by day 5-7)**
- Ankle resistance band-all 4 directions
- Patella Mobs
- Gentle overpressure into full extension (PT passively or patient actively)
- Weight shifts in full extension brace
- Straight leg raises (flexion, abduction, adduction)
- Cold Pack with full extension

Criteria for entering phase II:

- Full passive knee extension
- Minimal joint effusion
- Quadriceps voluntary initiation with quad set and SLR
- A/PROM knee flexion to 90 degrees
- Good patellar mobility
- Independent ambulation

Early Post-Operative Phase: Approximately Weeks 2 to 4

Goals:

- A/PROM 0-110/120 degrees
- Perform SLR with no extension lag
- Reciprocal Stair Climbing

Brace/Assistive Device

- Discontinue use of crutches by **day 10-14**
- Discontinue brace once voluntary quad control is demonstrated

Treatment:

- Closed kinetic chain quadriceps strengthening activities as tolerated (step-ups, leg press 90-30 degrees)
- Stationary Bicycle
- Quadriceps isometric at 40 degrees, 60 degrees and 90 degrees
- Weight shifts – Medial/Lateral & Diagonal
- OKC- Knee extension 90° - 40°
- PROM exercises 0-110/120 degrees
- Continue straight leg raises with progression 1# per week proximal loading
- Manual Patella Mobs/Scar Mobs

Criteria for entering phase III:

- No effusion
- ROM 0-110/120 degrees
- No joint line or patellofemoral pain
- Quad & Hamstring strength $\geq 60\%$ of the non-injured leg (Dynamometry)

Intermediate Post-Operative Phase: Approximately Weeks 4 to 8

Goals:

- Restore normal gait
- Restore knee ROM to 0-125 degrees
- Quadriceps and Hamstring strength to $> 75\%$ of well leg
- Enhance proprioception, balance, and neuromuscular control

Treatment:

- Unlock Brace, discontinued use if sufficient quad strength present
- Knee concentric & eccentric 90° \leftrightarrow 40°-(no weights) at 4 weeks, Hamstring isometrics can be begun at **5-6 weeks post-op**
- Front & Lateral step down, progress to lateral stepping
- Standing Heel raises
- Forward and Lateral Mini Lunges (30° - 40° of flexion) **with quad control**
- Single leg Balance and Perturbation training with knee slightly flexed
- Pool exercises – forward & backwards walk/run (forward at week 6)
- Advance core stabilization exercise
- Perturbation training-single leg balance \rightarrow stable vs. unstable surfaces

Criteria for entering phase IV:

- PROM 0-125 degrees
- Quadriceps and Hamstring Strength & Girth $\geq 75\%$ non-injured leg

Late Post-Operative Phase: Approximately Weeks 8 to 10

Goals:

- Full range of motion
- Quadriceps and Hamstring strength $\geq 80\%$ non-injured leg
- Normal gait pattern

Treatment:

- Light isotonic hamstring exercises **begun 6-8 weeks post-op**
- Mini Squats 0° - 30° progress to 45° - 60° with forward trunk tilt to unload ACL
- Dynamic/Plyometric leg press (**Begin at ≥ 10 weeks**)
- Progress lateral stepping and lateral step-down exercises with resistance bands on distal femur creating a medial pull
- Advanced core stabilization
- Continue phase III exercises if appropriate
- Walking program – 10 minutes minimum, increasing by 10 minutes per week

Criteria for entering phase five:

- Quadriceps and Hamstring Strength & Girth $>80\%$ of the non-injured leg
- Full knee AROM with no patellofemoral pain
- Score of “Good “ on the LESS to be able to begin Plyometric Training Protocol

Advanced Activity Phase: Approximately Week 10-16

Goals:

- Baseline FMS, Y-Balance tests
- Perform hop testing (**no sooner than 12-14 weeks**)
- Improve strength, endurance, and proprioception of the lower extremity to prepare for sport activity

Treatment:

- Begin walk→run protocol (when able to perform a controlled single leg squat (injured leg) to 60° of knee flexion)
- Begin Plyometric Training Protocol **no sooner than 12-14 weeks** * If LSI $\geq 90\%$ of uninjured leg, with hop tests- May be delayed longer if allograft reconstruction- patient healing and graft fixation dependant
- Eccentric exercises for all LE muscles
- Closed Kinetic Chain exercise to progress to 75° - 90° of flexion
- Isokinetics-mid range speeds (180 degrees/sec)

[Link to clinical reference protocol](#)