

Postoperative Rehabilitation Protocol: Physeal Sparing Anterior Cruciate Ligament Reconstruction

The following protocol utilizes a blend of both criteria and timeframes as the determinants of advancement. It is recognized that many athletes will feel good relatively early in their rehabilitation and want to advance to higher level activities as a result. In spite of rapid functional progress, it is important to respect the biological component of recovery and limit advancement if the timeframe for a given healing stage has not been completed. Overall, this protocol targets return to full unrestricted activity at 9 months if all other criteria are also met. If the criteria are met sooner, the patient must restrict his/her activity level until the end of the 9th post-op

*CPM is at physician's discretion depending on ROM progression

Week 1: (Visit #1 scheduled to begin one week post –op)

Goals:

- 1) Ambulation/Brace Use: **Toe-Touch Weight Bearing**
Post-op brace locked in full extension for ambulation
Sleep with brace locked in full extension
- 2) Maintain Full Knee Extension
- 3) Minimize Pain and Effusion – Compression wrap, elevation, ice
- 4) Good quad activation
- 5) Patient Education:
 - What to expect, how to maintain extension
 - CPM review (if applicable)
 - Crutches, wt bearing status
 - Hinged post-op brace education

Exercises:

- CPM Machine – start at 0 – 30 degrees. Increase about 10 degrees per day.
- PROM
 - a. Wall Slides Seated Active Assistive Knee Flexion
 - b. Prone Dangle
 - c. Passive resting extension with heel prop
- Patellar Mobilizations
- Quad muscle Activation (Functional E-Stim w/ Quad setting and/or Biofeedback)
- SLR x3 (Flexion, Adduction, Abduction)
- Hamstring/Calf Stretches
- Ankle Pumps
- Gait Training
- Home Exercise Program (2-3 times per day)

Week 2 to 4:

Goals:

- 1) Ambulation/Brace Use: -Continue crutch use, **PWB brace locked in full extension**

****In Physical Therapy only, WBAT without brace for ROM, strength, & gait training****

****Continue to sleep with brace locked in full extension until end of week 4****

- 2) Maintain Full Knee Extension
- 3) Minimize Effusion and pain

- 4) Promote Knee Flexion:
 - 90° by end of week 2
 - 120° by end of week 4
- 5) Good patellar mobility
- 6) Fair proprioception, involved leg
- 7) Independent with home exercises

Exercises:

- As previous
- Scar Mobilization/Massage
- Proprioceptive Neuromuscular Facilitation, Progressive Resistive Exercises
- Manual/Machine resisted leg press
- Balance/Proprioception
- Isometric Knee extension 90-60°
- Stationary Bike for ROM
- Mini-Squats progress up to 90°
- Step ups
- Retro Treadmill/Stairmaster
- Core
- Hip abduction/external rotation
- Review HEP

Weeks 4 to 16:

Goals:

- 1) Discontinue crutch use **at 4 weeks**
- 2) Ambulation/Brace Use:
 - After 4 weeks**, unlock post-op brace for ambulation (90° – progress to open) if following criteria are met:
 - a. SLR without quadriceps lag (10 repetitions)
 - b. Active knee flexion range to greater than angle of brace
 - After 6 weeks**, wean and discontinue post-op brace if criteria met
 - a. ROM \geq 100°
 - b. Single Leg Squat 30° with good knee control
- 4) Normalize Gait Pattern
- 5) Full ROM
- 6) Enhance Strength
- 7) Enhance Proprioception/Balance
- 8) Improve Local Muscular Endurance
- 9) Initiate Cardiovascular training

Exercises:

- As above
- Functional Strengthening
- Proprioceptive Neuromuscular Facilitation, Progressive Resistive Exercises
 - Manual/Machine resisted leg press
 - Balance/Proprioception
 - Squats to 90 degrees
 - Single leg squats

- Step ups
- Retro Treadmill/Stairmaster
- Review Home Exercise Program (2 times per day)

12 weeks:

- May add open chain knee extension through full range

Weeks 16 to 24:

Goals:

- 1) Criteria to begin straight ahead running, double-leg hopping:
Isokinetic Test - Quad Peak Torque Deficit $\leq 25\%$ at $180^\circ/\text{sec}$ and $300^\circ/\text{sec}$.
- 2) KT 1000 test: 15#, 20#, Quad Active, Manual Maximum (if available)

Exercises:

- Continue strength, endurance, proprioception progression
- Begin double-leg hopping, jogging, agility drills as able and if passed Isokinetic Test
- Initiate sport specific activities and double-leg plyometrics as able and if passed Isokinetic Test

Weeks 24 to 36:

Goals:

- 1) Gradual Return to unrestricted sports if Criteria met
 - a. Pain-free running
 - b. Functional Tests ($>90\%$) and Pain free
 - c. Isokinetic test
Quadriceps Peak Torque Deficit $\leq 10\%$
Total Work $\leq 10\%$
 - d. KT 1000 test: 15#, 20#, Quad Active, Manual Maximum (if available)
 - e. Cardiovascular endurance to subjective pre-morbid level

Exercises:

- Single-leg plyometrics
- Cutting/pivoting drills with stutter step pattern
- High intensity aerobic/anaerobic sport specific training
- Advanced lower extremity strengthening

RETURN TO SPORTS CRITERIA

- 1) 90% Functional tests
- 2) $\geq 90\%$ Isokinetic Test at $180^\circ/\text{sec}$, and $300^\circ/\text{sec}$
- 3) Full knee ROM
- 4) 9 months post-op

Recommended Functional Hop Test:

- Triple Hop for distance
- Single Hop for distance
- Lateral Hop (12"x12" squares separated by 12"- # of hops IN BOX in 20 seconds)
- Unilateral Vertical Jump

Postoperative Bracing Instructions

Post-op Week	Brace Status	Weight Bearing
Week 0-3	Locked at 0°	Toe-Touch
Week 4	Open 0°-50°	Partial Weight Bearing (PWB)
Week 5	No Brace (at home) Open 0°-90°	FWB FWB
Week 6	No Brace	FWB