

## **PCL - Non Operative Rehabilitation Guideline**

This rehabilitation program is designed to return the individual to their activities as quickly and safely as possible. It is designed for rehabilitation following a PCL injury/tear, typically grade I and II. Grade III tears may have an immobilization period prior to onset of rehabilitation, per provider order. Modifications to this guideline may be necessary dependent on physician specific instruction, degree of the tear, specific tissue healing timeline, chronicity of injury and other contributing impairments that need to be addressed. This evidence-based Non-Operative PCL guideline is criterion-based; time frames and visits in each phase will vary depending on many factors including patient demographics, goals, and individual progress. This guideline is designed to progress the individual through rehabilitation to full sport/ activity participation. The therapist may modify the program appropriately depending on the individual's goals for activity following PCL injury.

This guideline is intended to provide the treating clinician a frame of reference for rehabilitation. It is not intended to substitute clinical judgment regarding the patient's post injury care, based on exam/treatment findings, individual progress, and/or the presence of concomitant injuries or complications. If the clinician should have questions regarding progressions, they should contact the referring physician.

### **General Guidelines/Precautions:**

- Avoid hyperextension for 12 weeks
- Prevent posterior tibial translation for 12 weeks (no hamstring strengthening)
- PCL brace is to be worn x 12 weeks
- PCL loading occurs at higher knee angles. It is prudent to use smaller knee angles (0-50 deg) before progressing to larger knee angles (50-100 deg.) because PCL forces generally increase as knee angle increases.
- With regards to squat progression, PCL loading is the least with one-leg squat, progressing to wall squat with feet farther from the wall (ie wall squat long), and finally wall squat with feet closer to the wall (wall squat short).
- With regards to lunge progression, in order of least loading to greatest loading is: forward lunge with short step forward, then long step forward, then side lunge. In addition if the lunge is completed with both feet stationary it produces less force than if lunge is completed by stepping forward and pushing back to the original position.
- Two tracks are listed. The prolonged track is for those in which the provider feels needs increased time to progress due to degree of tear, concomitant injuries or other factors they feel may affect the healing process.

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| PHASE  | SUGGESTED INTERVENTIONS  | GOALS/MILESTONES FOR PROGRESSION   |
|--|--|--|
| <p><b>Phase I</b><br/>Maximum Protection Phase</p> <p>0-4 Typical Track Weeks</p> <p>0-6 Prolonged Track Weeks</p> <p>2-3/week Expected Visits</p> | <p><b>Specific Instructions:</b></p> <ul style="list-style-type: none"> <li>• Brace locked at 0, patient must sleep in locked brace</li> <li>• PWB with crutches 0-2 weeks</li> <li>• WBAT with crutches 2-4 weeks</li> <li>• Start weaning crutches at 4 weeks</li> </ul> <p><b>Suggested Treatments:</b></p> <ul style="list-style-type: none"> <li>• Modalities as indicated: <ul style="list-style-type: none"> <li>• Edema controlling treatments</li> </ul> </li> <li>• ROM: <ul style="list-style-type: none"> <li>• 0-2 weeks prone PROM 0-90</li> <li>• 2-6 weeks PROM to tolerance prone or supine</li> <li>• May bike at 3 weeks</li> </ul> </li> <li>• Manual Therapy: <ul style="list-style-type: none"> <li>• Patellar mobilizations</li> </ul> </li> </ul> <p><b>Exercise Examples:</b></p> <ul style="list-style-type: none"> <li>• Quadricep isometrics. May use NMES if not progressing</li> <li>• Multiangle quadriceps isometrics</li> <li>• SAQ (60-0) at 2 weeks</li> <li>• SLR</li> <li>• NWB hip activation (side lying hip abduction/side lying clamshells)</li> <li>• Ankle pumps</li> <li>• Gastrocnemius stretch</li> <li>• Mini-squats/leg press 0-45 deg.</li> <li>• Single leg squat 0-45 deg.</li> <li>• Weight-shifts</li> </ul>  | <p><b>Goals of Phase:</b></p> <ul style="list-style-type: none"> <li>• PCL ligament protection</li> <li>• Decrease pain and inflammation</li> <li>• Decrease edema</li> <li>• Quadricep activation</li> </ul> <p><b>Criteria to Advance to Next Phase:</b></p> <ul style="list-style-type: none"> <li>• PROM to 125 deg. pain free</li> <li>• Crutches weaned, gait normalized</li> <li>• No extensor lag with SAQ or SLR</li> </ul> |
| <p><b>Phase II</b><br/>Strengthening</p> <p>4-8 Typical Track Weeks</p> <p>6-12 Prolonged Track Weeks</p> <p>2-3/week Expected Visits</p>          | <p><b>Specific Instructions:</b></p> <ul style="list-style-type: none"> <li>• Continue with PCL brace</li> <li>• WBAT crutches should be weaned</li> <li>• Limit double leg strengthening exercises to 70 deg. knee flexion</li> </ul> <p><b>Suggested Treatments:</b></p> <ul style="list-style-type: none"> <li>• Modalities as indicated: <ul style="list-style-type: none"> <li>• Edema controlling treatments</li> </ul> </li> <li>• ROM: <ul style="list-style-type: none"> <li>• Unrestricted AROM</li> </ul> </li> <li>• Manual Therapy: <ul style="list-style-type: none"> <li>• Continue with Patellar mobilizations as indicated</li> </ul> </li> </ul> <p><b>Exercise Examples:</b></p> <ul style="list-style-type: none"> <li>• Double leg strength full extension to 70 deg. flexion (ie leg press or hip sled)</li> <li>• Static lunge, no more than 45 deg. knee flexion</li> <li>• Long wall sit (feet in line with knees at end of squat position), progress to short wall sit (feet behind knees at end of squat position)</li> <li>• Gluteal progression</li> <li>• Double leg bridges on ball with knees extended</li> <li>• Single leg deadlift with knee extended</li> <li>• Step ups</li> <li>• Single leg balance squat</li> <li>• Please refer to general guidelines/precaution statement for progression and understanding PCL loading principles</li> <li>• Non-impact proprioception and balance on single leg</li> </ul> | <p><b>Goals of Phase:</b></p> <ul style="list-style-type: none"> <li>• PCL ligament protection</li> <li>• Full ROM</li> <li>• Address gait mechanics</li> <li>• Activate gluts for stability and biomechanical protection</li> </ul> <p><b>Criteria to Advance to Next Phase:</b></p> <ul style="list-style-type: none"> <li>• AROM 0-130 pain free</li> <li>• No knee valgus with closed chain exercises</li> </ul>                 |

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|---|--|---|
| <p><b>Phase III</b><br/>Advanced Strengthening</p> <p>8-12 Typical Track Weeks</p> <p>13+ Prolonged Track Weeks</p> <p>1-2/week Expected Visits</p> | <p><b>Specific Instructions:</b></p> <ul style="list-style-type: none"> <li>Discontinue PCL brace at 12 weeks</li> <li>Isolated hamstring exercises may begin at end of typical track begin this at 0-55 deg</li> </ul> <p><b>Suggested Treatments:</b></p> <ul style="list-style-type: none"> <li>ROM:               <ul style="list-style-type: none"> <li>Unrestricted AROM</li> </ul> </li> </ul> <p><b>Exercise Examples:</b></p> <ul style="list-style-type: none"> <li>Continue to add resistance to double leg press or hip sled</li> <li>Continue to add resistance to single leg press or hip sled</li> <li>Squat and lunge progression to most advanced level per PCL loading guidelines</li> <li>Continue proprioception and balance on single leg</li> <li>Continue to emphasize gluteal activation and gluteal control of hip and pelvis with activities.</li> <li>Functional return to work and sport exercises/drills</li> </ul> | <p><b>Goals of Phase:</b></p> <ul style="list-style-type: none"> <li>Progress closed chain strength to beyond 70 deg. of knee flexion</li> <li>Initiate running program per running protocol (when quad girth is greater than 90% of contralateral side)</li> <li>Return to sport when these criteria are met, per physician clearance at           <ul style="list-style-type: none"> <li>Full AROM</li> <li>Greater than 85-90% quad strength</li> <li>No evidence of giving way</li> <li>Greater than 90% on return to play testing</li> </ul> </li> </ul> |

**\*\*NOTE:** Progression of functional activities should be performed only as pain and proper biomechanics allow. Emphasis should be on proper shock absorption and control of dynamic valgus stress at knee (hip medial rotation with knee valgus) with each task performed. Progression to single limb based tasks (deceleration, hopping, and cutting) should not be performed until double limb activities have been mastered. Activities requiring dynamic control of rotational stress at the knee (cutting, multiple plane lunges/jumps/hops) should not be performed until sagittal and frontal plane control has been mastered. Return to sport may occur at any time during this stage as cleared by physician and as progress and goal achievement occurs.

**REFERENCES:**

Escamilla, Rafael et al. Cruciate Ligament Force during the Wall Squat and the One-Leg Squat. *Medicine & Science in Sports & Exercise*, July 2008, 408-417

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