

### ACL Reconstruction

*Pre-Operative Rehabilitation:*

<b>Goals:</b>	<ul style="list-style-type: none"> <li>• Full active and passive knee extension ROM</li> <li>• Effusion/edema control</li> <li>• Independent SLR without extensor lag</li> <li>• Isolated quadriceps activation</li> <li>• Establish baseline strength measures for uninvolved LE</li> <li>• Patient education</li> </ul>
<b>Exercise recommendations:</b>	<ul style="list-style-type: none"> <li>• Quad sets</li> <li>• 4-way SLR</li> <li>• Heel slides</li> <li>• Terminal knee extensions</li> <li>• Gastroc and Hamstring Stretching</li> <li>• Heel prop</li> </ul>
<b>Modalities:</b>	<ul style="list-style-type: none"> <li>• Neuromuscular electrical stimulation</li> <li>• Ice/compression</li> </ul>
<b>Patient Education:</b>	<ul style="list-style-type: none"> <li>• Post-op expectations</li> <li>• Importance of protecting graft, regaining knee extension, and controlling swelling</li> <li>• Discussion of return to activity timelines</li> <li>• Education related to assistive device and brace use</li> </ul>







**Surgery: Everyone’s post-op protocol may be personalized to their surgery and circumstances. The following is meant to be a guide.**

**Post-op Brace:**

-Brace should be locked in extension for ambulating until muscle strength has returned to the point the brace can be discontinued. Exception would be if the physical therapist advises otherwise (listen to your PT!) or we wish for you to use the brace for 6 weeks such as the case of a meniscus repair (repaired with sutures).

-Patient is weight bearing as tolerated (WBAT) with two crutches unless otherwise instructed. The crutches can be discontinued once appropriate quadriceps control is achieved (ROM at least 0-90 and able to perform SLR without extensor lag. Patient should also be able to ascend and descend steps with minimal pain and instability).

*Phase 1 (Week 0-2)*

<p><b>Goals:</b></p>	<ul style="list-style-type: none"> <li>• Protect graft</li> <li>• Proper use of brace locked in extension</li> <li>• Decrease swelling</li> <li>• Restore knee extension ROM</li> <li>• Gait training with AD</li> <li>• Isolated quadriceps activation</li> </ul>
<p><b>Hygiene:</b></p>	<ul style="list-style-type: none"> <li>• Remove original dressing POD-2. Replace with sterile gauze and compression wrap. Leave white Steri-Strips in place and allow to fall off on their own in time.</li> <li>• You may shower after removal of original dressing but you must keep the area clean and dry. Waterproof bandages or saran wrap works well. Do not wear brace in shower.</li> </ul>
<p><b>Exercise Recommendations:</b></p>	<ul style="list-style-type: none"> <li>• Ankle pumps   </li> <li>• Quad sets   </li> <li>• 4-way SLR (brace locked in extension)   </li> <li>• Heel slides   </li> <li>• Gastroc/Hamstring stretching   </li> <li>• Heel prop   </li> </ul> <p>***For quad tendon grafts it is important to promote quadriceps activation in more extended positions of the hip***</p>
<p><b>Modalities:</b></p>	<ul style="list-style-type: none"> <li>• Ice/compression/elevation</li> <li>• NMES to quadriceps (home unit may be appropriate)</li> </ul>

<b>Manual Therapy:</b>	<ul style="list-style-type: none"> <li>• Patellar mobilizations</li> <li>• Gentle PROM seated at edge of plinth</li> </ul>
<b>Patient Education:</b>	<ul style="list-style-type: none"> <li>• Reinforce importance of extension ROM</li> <li>• Reinforce proper quadriceps activation (visualize patella gliding superiorly)</li> <li>• WBAT with crutches and brace locked in extension</li> </ul>

*Phase 2: (Weeks 2-6)*

<b>Goals:</b>	<ul style="list-style-type: none"> <li>• Full knee extension ROM</li> <li>• Improving gait without AD</li> </ul>
<b>Exercise Recommendations:</b>	<ul style="list-style-type: none"> <li>• Stationary bike</li> <li>• Begin closed chain exercises: mini squats, mini lateral lunges, heel raises/toe raises</li> <li>• Hip and core strengthening</li> <li>• Multi-angle isometrics</li> <li>• Standing balance/proprioception exercises</li> <li>• Gait training/exercises (retro walking, side stepping)</li> </ul>
<b>Modalities:</b>	<ul style="list-style-type: none"> <li>• Continued ice/compression</li> <li>• Continued NMES as appropriate</li> <li>• May begin Blood Flow Restriction training if appropriate <ul style="list-style-type: none"> <li>➤ 60-80% Limb Occlusion Pressure</li> <li>➤ <i>SLRx4, Calf Raises, Quad Sets, NMES</i></li> <li>➤ <i>Recommended set/rep scheme: 30 reps followed by 3x15 reps with 30 second rest intervals between sets</i></li> </ul> </li> </ul>
<b>Manual Therapy:</b>	<ul style="list-style-type: none"> <li>• Flexion and extension stretching/PROM</li> <li>• Patellar Mobilizations</li> </ul>
<b>Brace:</b>	<ul style="list-style-type: none"> <li>• May open brace for ambulation once patient has independent SLR without extensor lag, adequate/isolated quad function and achieved 90 degrees flexion</li> </ul> <p><b>***Refer to script for specific instructions related to patient***</b></p>
<b>Patient Education:</b>	<ul style="list-style-type: none"> <li>• Reinforce effusion/edema control</li> <li>• Reinforce importance of knee extension ROM</li> <li>• Advance HEP</li> </ul>

*Phase 3: (6-12 wks):*

<b>Goals:</b>	<ul style="list-style-type: none"> <li>• Full ROM</li> <li>• Normal Gait</li> <li>• Protect patellofemoral joint</li> <li>• Build strength</li> </ul>
<b>Exercise</b>	<ul style="list-style-type: none"> <li>• Advance closed chain strengthening with focus on</li> </ul>

<b>Recommendations:</b>	<ul style="list-style-type: none"> <li>quadriceps, gluteals, and hamstrings (squats, single leg squats, leg press, single leg RDLs, resisted step ups)</li> <li>• Hip and core strengthening</li> <li>• Static and dynamic balance training on variable surfaces</li> </ul>
<b>Modalities:</b>	<ul style="list-style-type: none"> <li>• Continue BFR training if appropriate or unable to tolerate load progression</li> <li>• Pain and swelling modalities PRN</li> </ul>
<b>Brace:</b>	<ul style="list-style-type: none"> <li>• Discontinue per PT script or surgeon instruction</li> </ul>
<b>Patient Education:</b>	<ul style="list-style-type: none"> <li>• Avoid compensatory loading strategies</li> </ul>

*Phase 4: (12-16 wks)*

<b>Goals:</b>	<ul style="list-style-type: none"> <li>• Improve strength, endurance and function</li> </ul>
<b>Linear Jogging:</b>	<ul style="list-style-type: none"> <li>• Minimum 3 months p/o</li> <li>• Must be cleared to begin by PT/MD</li> <li>• Quadriceps strength &gt;80%</li> <li>• Effusion ≤ trace</li> </ul>
<b>Exercise recommendations:</b>	<ul style="list-style-type: none"> <li>• Progressive quadriceps and lower extremity strength training.</li> <li>• Avoid compensatory loading strategies during closed chain strengthening (goblet squat-&gt;split squat-&gt;reverse lunge -&gt;Bulgarian split squat)</li> <li>• Linear Jogging program <b>***Avoid Anterior Knee Pain***</b></li> <li>• Advance balance/proprioception drills</li> <li>• Dual-task training/processing</li> </ul>
<b>Special Considerations:</b>	<ul style="list-style-type: none"> <li>• Allografts and concomitant meniscus repair will delay jogging and loading progression (see PT prescription)</li> </ul>

*Phase 5: (4-6 months)*

<b>Goals:</b>	<ul style="list-style-type: none"> <li>• Improve strength, power, endurance</li> </ul>
<b>Exercise recommendations:</b>	<ul style="list-style-type: none"> <li>• May begin low level linear plyometrics at 4-5 months p/o (drop jump, wall taps, squat jumps) with focus on proper loading strategy. <b>***Should not be performed if patient has loading deficiencies or significant residual quadriceps deficit***</b></li> <li>• May progress to unilateral linear plyometrics when appropriate strength, control, and quad loading strategy is demonstrated</li> <li>• Deceleration -&gt; Acceleration training</li> </ul>

<p><b>Return to Sport Testing (6 months p/o):</b></p>	<p><b>***6 month return to sport testing should be used to establish baseline numbers to drive POC over the next 2-3 months***</b></p> <ul style="list-style-type: none"> <li>• Quadriceps and hamstring strength testing (&lt;10% deficit)</li> <li>• Functional Hop Testing (&lt;10% deficit with proper loading strategy)</li> <li>• Y-Balance assessment (&lt;4cm deficit in anterior direction, males &gt;88% composite score, females &gt;93% composite score)</li> <li>• Drop Vertical Jump Analysis</li> <li>• Single leg forward step-down analysis</li> <li>• Circumferential Girth Measures</li> <li>• Single leg drop vertical jump test (contact/flight time comparisons)</li> <li>• ACL-RSI</li> </ul>
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*Phase 6: 6+ months p/o*

<p><b>Exercise recommendations:</b></p>	<ul style="list-style-type: none"> <li>• Advanced dynamic plyometrics and agility training</li> <li>• Sport specific training and simulation</li> <li>• Participation in controlled practice environments if approved by PT and MD.</li> </ul>
<p><b>Return to Sport Testing (8-10 months p/o):</b></p>	<ul style="list-style-type: none"> <li>• Reassess return to sport testing</li> </ul>

**-Contemporary thoughts on timetable to return to sports:** For years the orthopedic community would allow patients to go back to sports within 5-6 months following ACL surgery. What we have learned over the years with increased research is that the patients who returned that quickly were more susceptible to re-injury of the ACL. Currently, even if you are a professional athlete, 8-10 months is our current goal. Despite a patient feeling good and wishing to return prior to the 8 month mark we typically recommend waiting in most situations so as to decrease the risk of re-injury.

-Functional brace may be used for confidence while returning to sports. This will be discussed between the patient and MD.