

## REHABILITATION GUIDELINES FOR ACL RECONSTRUCTION WITH HAMSTRING AUTOGRAFT

PHASE I (WEEKS 1-4)

DATES:

Appointments	Physical therapy 2 x per week
Rehabilitation Goals	<ul style="list-style-type: none"> <li>• Protect graft during re-vascularization and fixation x 8-12 weeks</li> <li>• Control inflammation</li> <li>• Regain full knee PROM</li> <li>• Restore normal gait pattern</li> <li>• Patient education in rehab progression</li> </ul>
Precautions	<p><b>Brace:</b></p> <ul style="list-style-type: none"> <li>• locked in extension at all times until 1<sup>st</sup> PT visit</li> <li>• weeks 1-3: Unlock brace to 90 degrees as quad control allows</li> <li>• weeks 3-4: Wean from brace if patient demonstrates good quad control and normal gait mechanics</li> <li>• weeks 4-8: use brace in crowds, on uneven terrain etc.</li> </ul> <p><b>WB:</b></p> <ul style="list-style-type: none"> <li>• PWB with 2 crutches x 1 week</li> <li>• FWB with crutches weeks 1-4 progress as patient demonstrates good quad control, normal gait mechanics and no extension lag</li> <li>• NO limits on ROM progress as tolerated</li> <li>• Avoid hyperextension &gt;10 degrees</li> </ul>
Suggested Therapeutic Exercises	<ul style="list-style-type: none"> <li>• Patellar mobilizations</li> <li>• Gastroc/soleus stretches</li> <li>• Heel slides as tolerated</li> <li>• SLR all planes with brace in full extension and no extension lag</li> <li>• Quad sets, SAQ, LAQ with NMES as needed</li> <li>• Single leg balance progression (floor, foam, stability disc)</li> <li>• Mini squats</li> <li>• If good quad control: Lateral high stepping over cones</li> <li>• Lateral lunges (begin with 30 degrees knee flexion and 45 degrees hip flexion)</li> <li>• Core stabilization exercises</li> <li>• Aquatic therapy once incision is healed for gain and increased WB</li> </ul>

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Cardiovascular Exercises	<ul style="list-style-type: none"> <li>• Upper body ergometer</li> <li>• Stationary bike when ROM allows</li> </ul>
Progression Criteria	<ul style="list-style-type: none"> <li>• Good quad set, SLR without extension lag</li> <li>• Full extension/hyperextension</li> <li>• 90 degrees knee flexion</li> <li>• Minimal swelling/inflammation</li> <li>• Normal gait on level surfaces</li> </ul>

PHASE II (WEEKS 4-12)

DATES:

Appointments	Physical therapy 2x per week
Rehabilitation Goals	<ul style="list-style-type: none"> <li>• Restore normal gait with stairs</li> <li>• Maintain full extension</li> <li>• Regain full flexion by week 6</li> <li>• Protect graft and graft fixation</li> <li>• Increase hip, quadriceps and calf strength</li> <li>• Increase proprioception</li> <li>• Increase core strength</li> </ul>
Precautions	<ul style="list-style-type: none"> <li>• If necessary, continue to wean from crutches/brace; use 1 crutch until gait normalizes</li> </ul>
Suggested Therapeutic Exercises	<ul style="list-style-type: none"> <li>• ROM/flexibility as appropriate for patient</li> <li>• Initiate CKC quad strengthening (wall sits, step ups, mini squats, leg press 90-0 degrees, lunges); progress as tolerated</li> <li>• CKC TKE with tubing</li> <li>• 4 way hip, hamstring, calf exercise progression</li> <li>• Balance exercises (SLS on various surfaces/with perturbations, ball toss, balance beam, mini trampoline with medicine ball lifts in various directions)</li> <li>• Progress core strengthening (front planks, side planks with hip ABD)</li> <li>• Hamstring curls (gradually add resistance at week 12)</li> <li>• Aquatic therapy for waist deep running</li> </ul>
Cardiovascular Exercises	<ul style="list-style-type: none"> <li>• Stair Master</li> <li>• Nordic Track</li> <li>• elliptical,</li> <li>• stationary bike progressive time and resistance</li> </ul>

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Progression Criteria	<ul style="list-style-type: none"> <li>• No patellofemoral pain</li> <li>• Minimum of 120 degrees knee flexion</li> <li>• Minimal swelling/inflammation</li> </ul>
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PHASE III (12 – 18 WEEKS)

DATES:

Appointments	Physical therapy 1-2x per week
Rehabilitation Goals	<ul style="list-style-type: none"> <li>• Full ROM</li> <li>• Improve LE strength, endurance and proprioception to prepare for sports</li> <li>• Normalize running mechanics</li> <li>• Progressive resistance for hamstring strengthening</li> <li>• Strength 85% of uninvolved leg by week 14</li> </ul>
Precautions	<ul style="list-style-type: none"> <li>• Avoid overstressing graft fixation</li> <li>• Protect patella-femoral joint</li> </ul>
Suggested Therapeutic Exercises	<ul style="list-style-type: none"> <li>• Initiate eccentric quad strengthening</li> <li>• Continue to progress hip, quad, hamstring and calf strengthening</li> <li>• Progress proprioceptive activities: slide board, balance activities with sport specific equipment</li> <li>• Functional exercises at 14 weeks:             <ul style="list-style-type: none"> <li>- timed ground clock</li> <li>- timed one legged squat to 70 degrees</li> <li>- lateral shuffle</li> <li>- carioca</li> <li>- Y balance test</li> </ul> </li> <li>• Initiate treadmill running at week 12</li> <li>• Initiate running on land at week 16 – 18</li> </ul>
Cardiovascular Exercises	<ul style="list-style-type: none"> <li>• Aquatic: running, swimming (no breaststroke)</li> <li>• Running progression treadmill to land</li> </ul>
Progression Criteria	<ul style="list-style-type: none"> <li>• Strength and proprioception at least 70% of uninvolved leg and sufficient to initiate agility drills</li> <li>• Full, pain free ROM, no significant swelling</li> <li>• No patellofemoral irritation</li> <li>• Normal running gait</li> <li>• MD clearance for return to functional progression</li> </ul>

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PHASE IV (12-18 WEEKS)

DATES:

Appointments	Physical therapy 1-2x per week
Rehabilitation Goals	<ul style="list-style-type: none"> <li>• Symmetric performance of basic and sport specific agility drills</li> <li>• Single leg hop and 3 hop tests 85 % of uninvolved leg</li> <li>• Quad/hamstring strength at least 85 % of uninvolved leg</li> <li>• Gradual return to sports by 6-7 months</li> </ul>
Precautions	<ul style="list-style-type: none"> <li>• Initiate sports brace if recommended by physician</li> </ul>
Suggested Therapeutic Exercises	<ul style="list-style-type: none"> <li>• Initiate plyometrics (patient/sports specific)</li> <li>• Progress running distance</li> <li>• Agility progression                             <ul style="list-style-type: none"> <li>- cutting</li> <li>- cariocas</li> <li>- figure 8's</li> <li>- 1 and 2 leg jumping, bounding</li> <li>- acceleration/deceleration</li> <li>- ladder drills</li> </ul> </li> <li>• Sport specific drills</li> </ul>
Progression Criteria	<ul style="list-style-type: none"> <li>• No patellofemoral or soft tissue complaints</li> <li>• Necessary ROM, strength, endurance and proprioception to safely return to work or athletics</li> <li>• MD clearance to resume partial or full activity at month 6 or 7</li> <li>• Gradual return to sports after cleared by MD and with continued HEP for maintain strength and endurance</li> </ul>

References:

[http://www.brighamandwomens.org/Patients\\_Visitors/pcs/rehabilitationservices/Physical-Therapy-Standards-of-Care-and-Protocols/Knee%20-%20ACL%20Hamstring%20Tendon%20Autograft,%20protocol.pdf](http://www.brighamandwomens.org/Patients_Visitors/pcs/rehabilitationservices/Physical-Therapy-Standards-of-Care-and-Protocols/Knee%20-%20ACL%20Hamstring%20Tendon%20Autograft,%20protocol.pdf)

<http://www.sosmed.org/protocols/pt-protocols/ACL-HAMSTRING.pdf>

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