

# AUTOLOGOUS CHONDROCYTE IMPLANTATION FEMORAL DEFECT

## General Considerations:

- Use of CPM is advised as are ice, compression, elevation, and NSAIDs for edema and pain control
- Pain and swelling need to be carefully monitored throughout the rehab process. If either occurs, the activity needs to be identified and adjusted to lessen the irritation. Ignoring these symptoms may compromise the success of the surgery and the patient's outcome

## Phase I (0-6 weeks)

<p><b>ROM:</b></p> <ul style="list-style-type: none"> <li>• CPM after 4-12 hours (0-40) for 4 hours per day for 2 weeks; increase ROM 5-10 per day per quad control</li> <li>• Immediate motion exercise, focusing on passive extension to zero</li> <li>• Patellar mobilization</li> <li>• 90 flexion by 2 weeks; 105 by 4 weeks; 120 by 6 weeks</li> <li>• LE and low back stretching</li> </ul>	<p><b>BRACE:</b></p> <ul style="list-style-type: none"> <li>• Locked at 0 during weight bearing activities, may be unlocked for NWB activities as motion is encouraged</li> <li>• Locked at 0 during sleep for 2-4 weeks</li> </ul>
<p><b>STRENGTH:</b></p> <ul style="list-style-type: none"> <li>• Ankle exercises with theraband</li> <li>• Quad sets, ham sets, SLR in all directions</li> <li>• Active Knee extension 90-40 (without resistance)</li> <li>• Stationary bike as ROM permits after week 2</li> <li>• Begin progressive closed chain exercise starting with light resistance staying within weight bearing precaution</li> <li>• Leg press at week 4</li> </ul>	<p><b>GAIT:</b></p> <ul style="list-style-type: none"> <li>• NWB for 2 weeks</li> <li>• Progress to TTWB for 4 weeks; 25% body weight at 5 weeks</li> <li>• Extended standing should be avoided</li> </ul> <p><b>OTHER:</b></p> <ul style="list-style-type: none"> <li>• Focus on protecting healing tissue from load or shear forces</li> <li>• If symptoms occur, patient should reduce activities to prevent chronic pain cycle</li> </ul>

## Phase II (6-12 weeks)

<p><b>ROM:</b></p> <ul style="list-style-type: none"> <li>• Maintain full passive extension; gradually progress flexion to 125</li> <li>• Continue patellar mobilization and STM as needed</li> <li>• Progress LE and low back stretching program</li> </ul>	<p><b>BRACE:</b></p> <ul style="list-style-type: none"> <li>• Discontinue brace at 4-6 weeks</li> <li>• Discontinue crutches at 8-9 weeks</li> </ul>
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<p><b>STRENGTH:</b></p> <ul style="list-style-type: none"> <li>• Initiate partial squats (0-45) – avoid tibial/knee movement to lessen shear forces on knee joint</li> <li>• Begin toe/calf raises</li> <li>• Gradually increase time on stationary bike</li> <li>• Focus on closed chain exercises (progress leg press)</li> <li>• Include some open chain exercises without any resistance</li> <li>• Aquatic program for ambulation and balance training</li> <li>• Treadmill walking program as well as balance and proprioceptive drills (week 8-9)</li> <li>• Initiate front and lateral step ups</li> <li>• Weeks 8-12; stationary bike, stair master in limited arcs of motion, treadmill with incline 2-3 to reduce loads, may progress speeds</li> </ul>	<p><b>GAIT:</b></p> <ul style="list-style-type: none"> <li>• Progress WBAT</li> <li>• ½ body weight at 6 weeks, FWB at 8-9 weeks</li> </ul> <p><b>OTHER (criteria to progress to next phase):</b></p> <ul style="list-style-type: none"> <li>• Full ROM</li> <li>• Hamstrings within 10% of opposite leg, quads within 10-20% of involved leg</li> <li>• Able to walk 2 miles or bike for 30 minutes</li> <li>• 50 lateral step ups (8” height)</li> </ul>
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**Phase III (12-26 weeks)**

<p><b>ROM:</b></p> <ul style="list-style-type: none"> <li>• Full ROM</li> </ul>	<p><b>GAIT:</b></p> <ul style="list-style-type: none"> <li>• As patient improves, increase walking distance, cadence and incline</li> <li>• Light jogging may be initiated towards the end of this phase</li> </ul>
<p><b>STRENGTH:</b></p> <ul style="list-style-type: none"> <li>• Leg press 0-90 degrees</li> <li>• Bilateral squats (0-60)</li> <li>• Unilateral step ups</li> <li>• Lunges</li> <li>• Walking, bicycle, swimming, Nordic Track, Body Trek</li> <li>• Open chain extension 0-90 degrees</li> </ul>	<p><b>OTHER (criteria to progress to phase IV):</b></p> <ul style="list-style-type: none"> <li>• Full non painful ROM</li> <li>• Strength within 90% of opposite leg</li> <li>• No pain, inflammation or swelling</li> </ul>

**Phase IV (26-52 weeks)**

<p><b>STRENGTH:</b></p> <ul style="list-style-type: none"> <li>• Progress resistance as tolerated</li> <li>• Progress balance and agility drills</li> <li>• Sport specific activities; impact loading should be specialized to patient’s demands</li> <li>• Initiate light plyometric activity at 9 months (vertical, horizontal jumping, bilateral jumping, etc); emphasis on eccentric control with landing. Progress as tolerated and per motor control to diagonal and unilateral plyometric training</li> <li>• Month 10-18: Initiate light jog on treadmill using slight incline; start with 2 minute walk, 2 minute jog, etc.</li> </ul>	<p><b>OTHER:</b></p> <ul style="list-style-type: none"> <li>• Low impact sports (skating, roller blading, cycling) are allowed at 6 months</li> <li>• Higher impact sports (jogging, running, aerobics) are allowed 8-9 months</li> <li>• Very high impact sports (tennis, basketball, and baseball) are allowed at 12 months</li> </ul>
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