

## Autologous Cultured Chondrocyte Implantation (MACI®) Femoral Condyles Rehab Protocol

**Description of Procedure:** Two stage technique. **Stage 1:** A small amount of the patient’s own articular cartilage is harvested and through cell culturing techniques, the cell number is increased from a few hundred thousand to over 10 million cells. **Stage 2:** These cultured chondrocytes are then re-implanted in the knee on a porcine collagen membrane patch placed within the defect. The cells then gradually form hyaline-like cartilage to resurface areas of prior cartilage loss.

**Safety Warning:** Do not overload the implant, especially with shear forces, as patch delamination could occur. Early approved ROM is important to avoid excessive scarring and to stimulate the chondrocytes to form hyaline-like extracellular matrix. If the patient has had concomitant tibial tuberosity surgery, the weight bearing restrictions of that procedure take precedence.

	<b>Weight Bearing</b>	<b>Brace</b>	<b>ROM</b>	<b>Therapeutic Exercise</b>
<b>Phase I: 0 to 6 Weeks</b>	Foot flat, non-weight bearing with the use of two crutches	Brace is worn until independent straight leg raise can be performed without extension lag	<b>0 to 3 Weeks:</b> CPM: Use for 8 hours per day at 1 cycle/minute; begin at 0 to 30° increasing as rapidly as possible to re-establish full motion anytime patient does not feel ‘stretch’  <i>**Goal: To achieve full range of motion as soon as tolerated</i>	Prone hangs, heel props, quad sets, SLR, hamstring isometrics - complete exercises in brace if quad control is inadequate; core proximal program; normalize gait; FES biofeedback as needed  <i>** Incorporate use of stationary bike (high seat, low resistance) and patellar mobilization exercises after surgical dressing is removed</i>
<b>Phase II: 6 to 12 Weeks</b>	Progression to full weight bearing normalized gait pattern; no limping	None	Full active range of motion	Progress bilateral closed chain strengthening using resistance less than patient’s body weight, progress to supine unilateral leg press with low weight, high reps; continue opened chain knee strengthening  <i>*Contact Dr. Roberson before starting leg press (bilateral closed chain) for specific ROM restrictions (NO squats, wall slides, lunges or knee extension exercises)</i>

	<b>Weight Bearing</b>	<b>Brace</b>	<b>ROM</b>	<b>Therapeutic Exercise</b>
<b>Phase III: 12 Weeks to 9 Months</b>	Full, with a normalized gait pattern	None	Full active range of motion	<p><b>12 Weeks to 6 Months:</b> Advance bilateral and unilateral closed chain exercises with emphasis on concentric/eccentric control, continue with biking, elliptical and walking on treadmill; progress balance activities.</p> <p><i>**May progress stairs if adequate quad strength; no pain or swelling</i></p> <p><b>6 to 12 Months:</b> Advance strength training</p>
<b>Phase IV: 12 to 24 Months</b>	Full, with a normalized gait pattern	None	Full active range of motion	<p><b>Continue Strength Training:</b> Initiate light jogging; start with 2 minute walk/2 minute jog, emphasize sport-specific training; emphasize single leg loading, plyometrics, begin agility program: <u>High impact activities (basketball, tennis, etc.) may begin at 12 to 24 months after passing a pain free functional progression test</u></p>

*Progression back to sport is dependent on case per case basis and determined by Dr. Roberson.  
If pain or swelling occurs patient is expected to stop causative activity and follow-up with our office.*

*Leg extension exercises with resistance are not allowed indefinitely.*