

## Autologous Chondrocyte Implantation - Femoral Condyle Protocol

### PHASE 1 (0-12 weeks):

- **Weight Bearing**
  - 0-2 weeks: non-weight bearing
  - 2-4 weeks: partial weight bearing (30-40 lbs)
  - 4-6 weeks: progress to use of one crutch
  - 6-12 weeks: progress to full weight bearing
- **Brace**
  - 0-2 weeks: locked in full extension (remove for CPM and exercise)
  - 2-4 weeks: Gradually open brace 20 degrees at a time as quad control is gained
  - 4-12 weeks: Discontinue brace when quads can control SLR without extensor lag
- **ROM**
  - 0-4 weeks: CPM for 2 hour increments 6-8 hours/day at 1 cycle/minute
    - Begin at 0-30° increasing 5-10° daily per patient comfort
    - Patient should flex to at least 90° by week 4 and 120-130° by week 6
- **Therapeutic Exercise**
  - 0-2 weeks: Quad sets, SLR, hamstring isometrics
  - 2-6 weeks: Begin low resistance bilateral closed chain exercises
  - 6-10 weeks: Progress bilateral closed chain strengthening, begin opened chain knee strengthening
  - 10-12 weeks: Progress to unilateral closed chain exercises using resistance less than patient's body weight. Begin balance activities

### PHASE 2 (12 weeks-6 months):

- **Weight Bearing**
  - Full with normalized gait pattern
- **Brace**
  - None
- **ROM**
  - Full, active
- **Therapeutic Exercise**
  - Advance bilateral and unilateral closed chain exercises with emphasis on concentric/eccentric control
  - Low-impact aerobic exercise: biking, Stairmaster, and walking on treadmill
  - Progress balance activities

### PHASE 3 (6-9 months):

- **Weight Bearing**
  - Full with normalized gait pattern
- **ROM**
  - Full, pain-free

- **Therapeutic Exercise**
  - Advance strength training
  - Initiate light plyometrics and jogging
  - Start 2 minute walk/2 minute jog
  - Emphasize sport-specific training

**PHASE 4 (9-18 months):**

- **Weight Bearing**
  - Full with normalized gait pattern
- **ROM**
  - Full, pain-free
- **Therapeutic Exercise**
  - Continue strength training
  - Emphasize single leg loading
  - Begin progressive running and agility program
  - High impact activities may begin at 16 months if pain free

**Return to Sport/Work Criteria:** Dynamic neuromuscular control with multi-plane activities without pain or swelling.

\*Respect chondrocyte graft site with closed chain activities: If anterior, avoid loading in full extension; if posterior, avoid loading in flexion > 45°

\*\* If pain or swelling occurs with any activities, they must be modified to decrease symptoms