

**Roidis Nikolaos, MD, PhD, DSc**  
**Senior Consultant Orthopaedic Surgeon**  
**3<sup>rd</sup> Orthopaedic Department**  
**KAT Hospital**

## **AUTOLOGOUS CULTURED CHONDROCYTES FOR IMPLANTATION POSTSURGICAL REHABILITATION PROTOCOL**

### **POST-OP DAYS 1 – 14**

- Dressing:
  - POD 1: Debulk dressing, TED Hose in place
  - POD 2: Change dressing, keep wound covered, continue TED Hose
  - POD 7-10: Sutures out, D/C TED Hose when effusion resolved
- Brace – Locked in extension
- Crutches – non weight bearing (NWB)
- CPM – 0-30 degrees (2-hour increments for 8-10 hours/day)
- AAROM 0-30 degrees within pain limits
- Patellar mobilization (teach patient)
- Calf pumping
- Passive extension with heel on bolster or prone hangs
- Electrical stimulation in full extension with quad sets and SLR
- Quad sets, Co-contractions quads / HS in extension
- Straight leg raise (SLR) x 4 on mat (in brace) – parallel bars if poor quad control
- Gentle Hamstring, ITB stretching
- Ice pack with knee in full extension after exercise

### **GOALS**

- Pain / effusion control
- Good quad control

### **Weeks 2 - 4**

- Brace – Locked in extension
- Crutches – Flat foot weight bearing (FFWB)
- **Avoid twisting/pivoting on involved leg**
- Continue appropriate previous exercises
- Scar massage when incision healed
- CPM – 0-40 degrees
- AAROM, AROM 0-40 degrees
- SLR x 4 on mat (no brace) – Add light weight above knee if good quad control
- Pool therapy – Chest deep walking with aqua-jogger floatation device

### **GOALS**

- ROM 0-40 degrees
- No extensor lag

### **WEEKS 4 - 6**

- Brace – 0-30 degrees, continue to open to available range
- Crutches – Partial weight bearing (PWB)
- Continue appropriate previous exercises

- CPM – Add 5 degrees per day up to 90 degrees
- AAROM, AROM 0-90 degrees
- Pool therapy – Kickboard with gentle flutter kick from hip, knee in extension

#### **GOAL**

- AROM 0-90 degrees

#### **WEEKS 6 - 8**

- Brace – 0-90 degrees, continue to open to available range
- Crutches – PWB
- Continue appropriate previous exercises
- CPM – D/C
- AAROM, AROM 0-120 degrees
- Isometric co-contractions at 0, 30, 60, 90 degrees
- Stationary bike for ROM
- Pool therapy – Chest deep running

#### **GOALS**

- ROM 0-120 degrees
- No effusion

#### **WEEKS 8 - 10**

- Brace – D/C when good quad control
- Crutches:
  - Weight bearing as tolerated (WBAT) (D/C when gait is normal)
  - **Avoid twisting/pivoting on involved leg**
- Continue appropriate previous exercises
- PROM, AAROM, AROM to regain full motion
- SLR x 4 with weight below the knee if quad control adequate
- Weight shifts in full extension
- Stationary bike for progressive resistance and endurance
- Pool therapy – Unrestricted

#### **GOAL**

- Full ROM

#### **WEEKS 10 - 12**

- Continue appropriate previous exercises
- **Avoid twisting/pivoting on involved leg**
- Isometric open chain co-contractions at varying angle
- Total Gym – Mini squats (level 3-5) – No flexion > 45 degrees
- Passive flexion to 90 degrees (push up with opposite leg)
- Leg press with light resistance 0-30 degrees
- Hamstring curls – Carpet drags or rolling stool (closed chain)
- Heel raises – Double leg, progress to single leg
- Proprioceptive training – Double leg BAPS for weight shift
- Progress to single leg BAPS, ball toss and body blade
- Elliptical trainer

#### **GOAL**

- Normal gait

#### **MONTHS 3 - 6**

- Continue appropriate previous exercises
- Standing SLR x 4 with Theraband bilaterally

- Partial wall squats – No knee flexion past 45 degrees
- Forward, lateral, and retro step downs in parallel bars
- No knee flexion past 45 degrees (small step)
- Leg press with progressive resistance – No knee flexion past 45 degrees
- HS curl weight machine
- Fitter
- Slide board
- Treadmill – Forwards and backwards walking
- Swimming
- Quad stretches

**GOAL**

- Thigh girth equal bilaterally

**MONTHS 6 - 9**

- Continue appropriate previous exercises with increased resistance
- Progress to 90 degrees of knee flexion
- Increase resistance as tolerated
- Hip weight machine x 4 bilaterally
- Step downs with medium to large steps
- Sit-up progression
- Treadmill – Walking progression program

**GOAL**

- Walk 2 miles at 15 min/mile pace

**MONTHS 9 - 12**

- Continue appropriate previous exercises with progressive resistance
- Agility drills Plyometrics
- Progressive weight training
- Treadmill – Running progression program
- Low impact activities such as skating, roller blading, cross country skiing, cycling

**GOAL**

- Run 2 miles on treadmill at comfortable pace

**MONTHS 12 - 18**

- Continue appropriate previous exercises
- Knee extension weight machine
- Agility drills – Slow “S”, figure 8, zigzags, progress to sharper cutting motions
- Plyometrics – Advanced
- Running progression to track
- Repetitive impact activities such as aerobic classes
- Transition to home / gym program

**GOAL**

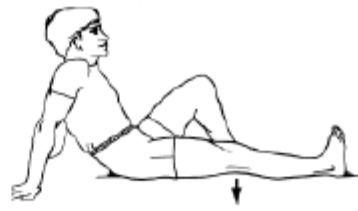
- Resume all activities

***\*NO CONTACT OR CUTTING SPORTS UNTIL 18 MONTHS POST-OP\****

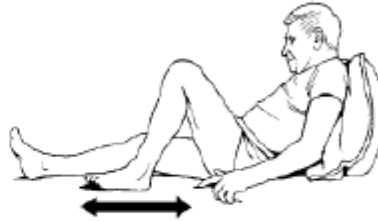
## KNEE POST-OP PHASE I

Perform exercises below frequently: 30 reps, 3 – 5x a day

**Quad Isometrics**



**Heel Slides**



**Active Assisted Motion**



**Ice Position 15 minutes 2-3 x per day**



**ADAPTED FROM:**  
Mark Galland, MD Physical Therapy Section  
Kenneth Kirby, PT, DPT William Beaumont Army Medical Center