



## **Postoperative Rehabilitation Protocol for Carticel Implantation for Femoral Condyle**

### **GENERAL GUIDELINES**

- Program is designed to protect the Carticel Implantation, minimize stress on the grafted area, preserve joint motion, and rehabilitate the extremities

### **GENERAL PROGRESSION OF ACTIVITIES OF DAILY LIVING**

Patients may begin the following activities at the dates indicated (unless otherwise specified by the physician):

- Showering – once dressing removed; no immersion until stitches/staples removed and wounds healed, if brace is present may remove for shower.
- Driving: when safely able to operate the controls of the vehicle. Any time for left knee surgery (assuming automatic transmission), and longer for right leg surgery.
- Return to work/school will depend on the individual needs

### **PHYSICAL THERAPY ATTENDANCE**

The following is an approximate schedule for supervised physical therapy visits:

- Aquatic exercises if available for first month
- Formal PT begins after patient is able to begin to bear weight usually 4-6 weeks
- 3 times per week is optimal
- Home exercises daily as instructed by the therapist
- Supervised physical therapy takes place for approximately 3-5 months post-op

### **PHASE I: Protection Phase:**

Begins immediately following surgery and lasts approximately six weeks. Patient is to protect the healing tissue from load and shear forces. Brace locked at 0° during weight-bearing activities. Sleep in the locked brace for 2-4 weeks.

### **Goals:**

- Protect healing bony and soft tissue structures
- Decrease pain and effusion
- Gradually improve knee flexion
- Restore full passive knee extension
- Regain quadriceps control

### **Weight bearing Status:**

- 1-2 weeks: Non weight bearing, may begin toe-touch weight bearing per physician orders
- 2-3 weeks: Toe touch weight bearing allowed based on quad function (approximately 20-30 lbs)
- 4-5 weeks: Partial weight bearing (approximately ¼ body weight)
- 6 weeks: May progress to weight bear as tolerated

### **Therapeutic Exercises:**

ROM:

- Begin Exercises 6-8 hours after surgery
- Gain full passive knee extension ASAP
- 1-3 weeks: Initiate Continuous Passive Motion (CPM) day 1: 8-12 hours/day
  - Progress 5°-10° /day
  - May continue CPM 6-8 hours/day for 4-6 weeks
- Motion guidelines on CPM
  - 1-2 weeks: Knee flexion 90°
  - 3-4 weeks: Knee flexion 105°
  - 5-6 weeks: Knee flexion 120°
- Stretch hamstrings and calf daily
- Begin patellar mobilization and soft tissue mobilization

Strengthening:

- Ankle pumps using rubber tubing
- Quad sets
- Isometrics of the quad and hamstrings (co-contraction in brace)
- Straight leg raises
- 4-6 weeks: Begin GAIT training in pool (chest deep water)

### **Swelling Control:**

- Ice, elevation and compression

### **Criteria to Progress**

- Full passive knee extension
- Knee flexion to 120°
- Minimal pain and swelling
- Good quadriceps control

### **PHASE II: Transition Phase:**

Begins 6 weeks post-op, and extends to the 12<sup>th</sup> post-op week. Discontinue post-operative brace at 6<sup>th</sup> week. Consider using an interim brace such as a short-runner or un-loader type.

### **Goals:**

- Gradually increase ROM
- Gradually improve quadriceps strength and endurance
- Gradual increase to functional activities

### **Weight-bearing Status:**

- Progress weight-bearing as tolerated
- 8-9 weeks: Progress to full weight-bearing
- 8-9 weeks: Discontinue crutches

### **Therapeutic Exercises:**

ROM:

- Gradually increase ROM
  - Knee flexion to 125°-135°
  - Maintain full extension
- Continue patellar mobilization and soft tissue mobilization
- Continue stretching program (hip, knee, and ankle)

### Strengthening:

- Progress to mini-squats (0°-45°) when able to be full weight bearing
- May continue hip flexion/extension/Abduction/Adduction
- Open chain knee flexion is OK
- Closed kinetic chain for knee extension utilizing resisted band while standing and weight machines as follows. Leg press is OK, active open chain knee flexion is OK.
- Stationary bike and/or elliptical machines can be used for cardio and leg conditioning; low resistance and gradually increase time
- Balance and Proprioception activities (e.g. single leg stance or mini-trampoline)
- Initiate front and lateral step-ups
- Continue use of pool for GAIT training and exercise until able to walk without limp, full weight bearing, and go up stairs without pain

### **Functional Activities:**

As pain and swelling decrease, the patient may gradually increase functional activities. The patient may also begin gradually increasing standing and walking. Increase biking and swimming activities.

### **Criteria to Progress:**

- Full ROM
- Acceptable Strength (estimated by manual effort)
  - Hamstrings within 10-20% of other leg
  - Quadriceps within 20-30% of other leg
- Balance testing within 30% of other leg
- Patient is able to walk 1-2 miles or bike 30 minutes

### **PHASE III: Maturation Phase:**

Begins approximately 12 weeks post-op, and extends to 26 weeks post-op.

### **Goals:**

- Improve functional strength and proprioception utilizing closed and/or open kinetic chain exercises
- Increase functional activities

### **Therapeutic Exercises:**

ROM:

- Patient should maintain 125°-135° flexion

Strengthening:

- Continue lower extremity exercise progression with emphasis on quads tone and strength
- Bilateral squats (0°-60°)
- Treadmill progressive walking program as tolerated
- Stairmaster/elliptical trainer, swimming is OK

### **Functional Activities:**

As patient improves, increase walking (distance, cadence, incline, etc)

**Criteria to Progress:**

- Full non-painful ROM
- Strength within 80-90% of other leg
- Balance and stability within 75% of other leg
- Rehabilitation and functional activities do not cause pain, inflammation and swelling

**PHASE IV: Functional Activities Phase:**

Return to sport at approximately 26-52 weeks

**Goals:**

- Safe and gradual return to work or athletic participation
- This may involve sports specific training, work hardening or job restrictions as needed
- Maintenance of strength, endurance and function
- Running progression
- Figure 8 progression, Carioca, Backward running, cutting
- Jumping (plyometrics) if needed for sport (i.e., volleyball or basketball)

\*\*\*These instructions are to be used as general guidelines. Before 3 months it is important not to go any faster even if the patient seems able, since the most important consideration is graft protection. Please have physician contacted if there are questions or concerns

**Kenneth A. Jurist, M.D. and Joseph H. Guettler, M.D.  
24255 Thirteen Mile Road, Suite 100  
Bingham Farms, MI 48025  
248-988-8085 Phone / 248-988-8565 Fax**

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