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**Postoperative Rehabilitation Protocol
for Carticel Implantation for Trochlea/Patella
AND Tibial Tubercle Osteotomy**



GENERAL GUIDELINES

- Program is designed to protect the Carticel Implantation, minimize stress on the grafted area, preserve joint motion, and rehabilitate the extremities
- No closed chain kinetic chain exercise for 6 weeks

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
- Non weight bearing x 6-8 weeks until cleared from physician

PHYSICAL THERAPY ATTENDANCE

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

- Aquatic exercises if available for first month
- 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

REHABILITATION PROGRESSION:

The following is a general guideline for progression of the rehabilitation program following patellar realignment. Progression through each phase should take into consideration patient status (e.g. healing, function) and physician advisement. Please consult the attending physician if there is uncertainty regarding the advancement of a patient to the next phase of rehabilitation.

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. Non weight-bearing 6-8 weeks until cleared by physician. Sleep in the locked brace for 4 weeks. Extended standing should be avoided.

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:

- Non-weight bearing for 6-8 weeks until cleared by physician
- Then progressive weight bearing
 - 25% body weight with brace locked
 - 50% body weight by week 2 in brace
 - 75% body weight by weeks 3-4 in brace

Therapeutic Exercises:**ROM:**

- Immediate motion exercises days 1-2
- 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 up to 6 weeks
- Motion guidelines for CPM Guidelines if tibial tubercle transplant
 - 2-3 weeks: Knee flexion 90° ○ 0-2 weeks: 0°
 - 3-4 weeks: Knee flexion 105° ○ 2-4 weeks: 0-30°
 - 5-6 weeks: Knee flexion 120° ○ 4-6 weeks: 30-60°
 - 6-8 weeks: 60-90°
- Quad sets and isometric adduction with biofeedback for VMO
- Heel slides from 0-90° for distal realignment
- CPM for 2 hours, twice daily, from 0-90° of flexion for distal realignment
- Non-weight bearing gastrocnemius/soleus hamstring stretches
- SLR in four planes with brace locked in full extension (can be performed in standing)
- Resisted ankle ROM with theraband
- Patellar mobilization (begin when tolerated by patient)
- Stretch hamstrings and calf daily
- Begin patellar mobilization and soft tissue mobilization

Swelling Control:

- Ice, elevation and compression

Criteria to Progress:

- Full passive knee extension
- Minimal pain and swelling
- 90 degrees knee flexion
- Good quadriceps control

PHASE II: Transition Phase:

Begins 6 weeks post-op, and extends to the 8th week post-op week.

Goals:

- Increase range of flexion
- Avoid overstressing fixation
- Increase quadriceps and VMO control for restoration of proper patellar tracking.

Brace:

6 – 8 weeks: Discontinue use for sleeping, unlock for ambulation as allowed by physician.

Weightbearing Status:

6-8 weeks: As tolerated with two crutches if cleared.

Therapeutic Exercises:

Continue exercises as noted above, progress towards full flexion with heel slides

- Progress to weight-bearing gastrocnemius/soleus stretching
- Discontinue CPM if knee flexion is at least 90°
- Begin aquatic therapy, emphasis on normalization of gait
- Balance exercises (e.g. single-leg standing, KAT)
- Remove brace for SLR exercises
- Stationary bike, low resistance, high seat
- Short arc quadriceps exercises in pain free ranges (0-20°, 60-90° of flexion) emphasize movement quality
- Wall slides progressing to mini-squats, 0-45° of flexion

Functional Activities:

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

Criteria to Progress:

Good quadriceps tone and no extension lag with SLR

- Non-antalgic gait pattern
- Good dynamic patellar control with no evidence of lateral tracking or instability

PHASE III: Maturation Phase:

Begins approximately 8 weeks post-op, and extends to 4 months post-op.

Weightbearing Status:

May discontinue use of crutches when the following criteria are met:

- No extension lag with SLR
- Full extension
- Non antalgic gait pattern (may use one crutch or cane until gait is normalized)

Therapeutic Exercises:

- Step-ups, begin at 2” and progress towards 8”
- Stationary bike, add moderate resistance
- 4 way hip flexion, adduction, abduction, extension
- Leg press 0-45° of flexion
- Closed kinetic chain terminal knee extension with resistive tubing or weight machine
- Swimming, Stairmaster for endurance
- Toe rises
- Hamstring curls
- Treadmill walking with emphasis on normalization of gait
- Continue proprioception exercises
- Continue flexibility exercises for gastrocnemius/soleus and hamstrings, add iliotibial band and quadriceps as indicated

Criteria to Progress:

Good to normal quadriceps strength

- No evidence of patellar instability
- No soft tissue complaints
- Normal gait pattern
- Clearance from physician to begin more concentrated closed kinetic chain exercises, and resume full or partial activity

PHASE IV: Functional Activities Phase:

Return to sport at approximately 4 to 6 months

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
- NO Jumping (plyometrics) until 12 months and then gradual progression if needed for sport (i.e., volleyball or basketball)
- Continue maintenance 3-4 times/week

*****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.**