

## OSTEOCHONDRAL AUTOGRAFT TRANSPLANTATION Patella/Trochlea Rehabilitation Guidelines

### PHASE I - PROTECTION PHASE (WEEKS 0-6)

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|------------------------|--|
| Goals:                 | <ul style="list-style-type: none"> <li>- Protection of healing tissue from load and shear forces</li> <li>- Decrease pain and effusion</li> <li>- Restoration of full passive knee extension</li> <li>- Gradual improvement of knee flexion</li> <li>- Regaining quadriceps control</li> </ul>   |
| Brace:                 | <ul style="list-style-type: none"> <li>- Locked at 0° during ambulation and weight-bearing activities</li> <li>- Sleep in locked brace for 4 weeks</li> </ul>  |
| Weight-Bearing:        | <ul style="list-style-type: none"> <li>- Immediate toe-touch weight-bearing 25% body weight with brace locked in full extension</li> <li>- 50% body weight week 2 in brace</li> <li>- 75% body weight week 3-4 in brace</li> </ul>   |
| Range of Motion:       | <ul style="list-style-type: none"> <li>- Immediate motion exercise Day 1-2</li> <li>- Full passive knee extension immediately</li> <li>- Initiate CPM day 1 for total of 8-12 hours/day (0-60°; if lesion &gt; 6cm<sup>2</sup> 0-40°) for first 2-3 weeks</li> <li>- Progress CPM ROM as tolerated 5-10° per day</li> <li>- May continue use of CPM for total of 6-8 hours per day for 6 weeks</li> <li>- Patellar &amp; soft tissue mobilization (4-6x per day)</li> <li>- Motion exercises throughout the day</li> <li>- Passive knee flexion ROM 2-3 times daily</li> <li>- Passive knee flexion ROM goal is 90° by 2-3 weeks</li> <li>- Passive knee flexion ROM goal is 105° by 3-4 weeks and 120° by week 6</li> <li>- Stretch hamstrings, calf</li> </ul> |
| Strengthening Program: | <ul style="list-style-type: none"> <li>- Ankle pump using rubber tubing</li> <li>- Quad setting</li> <li>- Straight leg raises (4 directions)</li> </ul>   |

- Toe-calf raises week 2
- Stationary bicycle when ROM allows
- Biofeedback and electrical muscle stimulation, as needed
- Isometric leg press at week 4 (multi-angle)
- Initiate weight shifts week 4
- May begin pool therapy for gait training and exercise week 4

Functional  
Activities:

- Gradual return to daily activities
- If symptoms occur, reduce activities to reduce pain and inflammation
- Extended standing should be avoided

Swelling Control:

- Ice, elevation, compression, and edema modalities as needed to decrease swelling

Criteria to Progress  
To Phase II:

- Full passive knee extension
- Knee flexion to 115/120°
- Minimal pain and swelling
- Voluntary quadriceps activity

**PHASE II - TRANSITION PHASE (WEEKS 6-12)**

Goals:

- Gradually increase ROM
- Gradually improve quadriceps strength/endurance
- Gradual increase in functional activities

Brace:

- Discontinue brace at 6-8 weeks

Weight-Bearing:

- Progress weight-bearing as tolerated
- Progress to full weight-bearing at 6-8 weeks
- Discontinue crutches at 6-8 weeks

Range of Motion:

- Gradual increase in ROM
- Maintain full passive knee extension
- Progress knee flexion to 120-125° by week 8
- Continue patellar mobilization and soft tissue mobilization, as needed
- Continue stretching program

### Strengthening

#### Exercises:

- Closed kinetic chain exercises (leg press 0-60°) week 8
- Initiate mini-squats 0-45° week 8
- Toe-calf raises
- Open kinetic chain knee extension without resistance
- Begin knee extension 0-30° then progress to deeper angles
- Stationary bicycle (gradually increase time)
- Stairmaster at week 12
- Balance and proprioception drills
- Initiate front and lateral step-ups
- Continue use of biofeedback and electrical muscle stimulation, as needed

#### Functional Activities:

- As pain and swelling (symptoms) diminish, the patient may gradually increase functional activities
- Gradually increase standing and walking

#### Criteria to Progress To Phase III:

- Full range of motion
- Acceptable strength level
  - Hamstrings within 10-20% of contralateral leg
  - Quadriceps within 20-30% of contralateral leg
- Balance testing within 30% of contralateral leg
- Able to walk 1-2 miles or bike for 30 minutes

### **PHASE III: REMODELING PHASE (WEEKS 13-32)**

#### Goals:

- Improve muscular strength and endurance
- Increase functional activities

#### Range of Motion:

- Patient should exhibit 125-135° flexion

#### Exercise Program:

- Leg press (0-60°; progress to 0-90°)
- Bilateral squats (0-60°)
- Unilateral step-ups progressing from 2" to 6"
- Forward lunges
- Walking program on treadmill

- Open kinetic chain knee extension (90-40°) – progress 1 pound every 10-14 days if no pain or crepitation – must monitor symptoms – may delay heavy resistance for up to 6 months
- Bicycle
- Stairmaster
- Swimming
- Nordic-Trak/Elliptical

- Functional Activities:
- As patient improves, increase walking (distance, cadence, incline, etc.)
  - Light running can be initiated toward end of phase based on physician decision

- Maintenance Program:
- Initiate at week 16-20
  - Bicycle – low resistance, increase time
  - Progressive walking program
  - Pool exercises for entire lower extremity
  - Straight leg raises
  - Leg press
  - Wall squats
  - Hip abduction / adduction
  - Front lunges
  - Step-ups
  - Stretch quadriceps, hamstrings, calf

- Criteria to Progress to Phase IV:
- Full non-painful ROM
  - Strength within 80-90% of contralateral extremity
  - Balance and/or stability within 75% of contralateral extremity
  - No pain, inflammation, or swelling

#### **PHASE IV - MATURATION PHASE (8-15 MONTHS)**

- Goals:
- Gradual return to full unrestricted functional activities

- Exercises:
- Continue maintenance program progression 3-4x/week
  - Progress resistance as tolerated

- Emphasis on entire lower extremity strength & flexibility
- Progress agility and balance drills
- Progress walking program as tolerated
- Impact loading program should be specialized to the patient's demands
- No jumping or plyometric exercise until 12 months
- Progress sport programs depending on patient variables

Functional  
Activities:

Patient may return to various sport activities as progression in rehabilitation and cartilage healing allows. Generally, low-impact sports such as swimming, skating, rollerblading, and cycling are permitted at about 6 months. Higher impact sports such as jogging, running, and aerobics may be performed at 8-9 months for small lesions or 9-12 months for larger lesions. High impact sports such as tennis, basketball, football and baseball are allowed at 12-18 months.

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