

OSTEOCHONDRAL AUTOGRAFT TRANSPLANTATION Patella/Trochlea Rehabilitation Guidelines

PHASE I - PROTECTION PHASE (WEEKS 0-6)

- Goals:**
- Protection of healing tissue from load and shear forces
 - Decrease pain and effusion
 - Restoration of full passive knee extension
 - Gradual improvement of knee flexion
 - Regaining quadriceps control
- Brace:**
- Locked at 0° during ambulation and weight-bearing activities
 - Sleep in locked brace for 4 weeks
- Weight-Bearing:**
- Immediate toe-touch weight-bearing 25% body weight with brace locked in full extension
 - 50% body weight week 2 in brace
 - 75% body weight week 3-4 in brace
- Range of Motion:**
- Immediate motion exercise Day 1-2
 - Full passive knee extension immediately
 - Initiate CPM day 1 for total of 8-12 hours/day (0-60°; if lesion > 6cm² 0-40°) for first 2-3 weeks
 - Progress CPM ROM as tolerated 5-10° per day
 - May continue use of CPM for total of 6-8 hours per day for 6 weeks
 - Patellar & soft tissue mobilization (4-6x per day)
 - Motion exercises throughout the day
 - Passive knee flexion ROM 2-3 times daily
 - Passive knee flexion ROM goal is 90° by 2-3 weeks
 - Passive knee flexion ROM goal is 105° by 3-4 weeks and 120° by week 6
 - Stretch hamstrings, calf
- Strengthening Program:**
- Ankle pump using rubber tubing
 - Quad setting
 - Straight leg raises (4 directions)

- 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



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- 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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