



OSTEOCHONDRAL AUTOGRAFT/ ALLOGRAFT TRANSPLANTATION Femoral Condyle Rehabilitation Program

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 weight-bearing activities
 - Sleep in locked brace for 2-4 weeks
- Weight-Bearing:
- Non weight-bearing for 2-4 weeks (physician direction)
 - If large lesion (>5cm²) may need to delay WB up to 4 weeks
 - Toe touch weight-bearing (approx. 20-30 lbs.) weeks 2-4
 - Partial WB (approx. 25-50% body weight) at week 6
- Range of Motion:
- Immediate motion exercise
 - Full passive knee extension immediately
 - Initiate CPM day 1 for 8-12 hours/day (0-40°) for 2-3 weeks
 - Progress CPM ROM as tolerated 5-10° per day
 - May continue CPM for 6-8 hours per day for up to 6-8 weeks
 - Patellar and soft tissue mobilization (4-6x day)
 - Passive knee flexion ROM 2-3 times daily
 - Passive knee flexion ROM goal is 90° by 1-2 weeks
 - Passive knee flexion ROM goal is 105-115° by 4 weeks and 120-125° by week 6
 - Stretch hamstrings, calf, and quadriceps
- Strengthening Program:
- Ankle pump using rubber tubing
 - Quad setting
 - Multi-angle isometrics (co-contractions Q/H)
 - Active knee extension 90-40° (if no articulation - no resistance)
 - Straight leg raises (4 directions)
 - Stationary bicycle when ROM allows
 - Biofeedback and electrical muscle stimulation, as needed
 - Isometric leg press at week 4 (multi-angle)
 - May begin use of pool for gait training & exercises week 6

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

PHASE II - TRANSITION PHASE (WEEKS 6-12)

Goals:

- Gradually increase ROM & WB to full
- Gradually improve quadriceps strength/endurance
- Gradual increase in functional activities

Criteria to Progress
To Phase II:

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

Brace:

- Discontinue brace at 6 weeks

Weight-Bearing:

- Progress weight-bearing as tolerated
- 75% body weight with crutches at 8 weeks
- Progress to full weight-bearing at 10-12 weeks
- May need to delay FWB up to 14 weeks if large lesion
- Discontinue crutches at 10-12 weeks

Range of Motion:

- Gradual increase in ROM
- Maintain full passive knee extension
- Progress knee flexion to 125-135°
- Continue patellar mobilization and soft tissue mobilization, as needed
- Continue stretching program

Strengthening
Exercises:

- Initiate weight shifts week 6-8
- Initiate mini-squats 0-45° week 8-10
- Closed kinetic chain exercises (leg press) week 8-10
- Toe-calf raises week 10-12
- Open kinetic chain knee extension, 1 lb./week week 10-12
- Stationary bicycle (gradually increase time)
- Balance and proprioception drills

- Initiate front and lateral step-ups
- Continue use of biofeedback and electrical muscle stimulation, as needed
- Continue use of pool for gait training and exercise
- May need to delay CKC exercises up to 14 weeks if large lesion

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

PHASE III: MATURATION PHASE (WEEKS 12-26)

- Goals:
- Improve muscular strength and endurance
 - Increase functional activities

Criteria to Progress
To Phase III:

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

- Range of Motion:
- Patient should exhibit 125-135° flexion – no restrictions

- Exercise Program:
- Leg press (0-90°)
 - Bilateral squats (0-60°)
 - Unilateral step-ups progressing from 2" to 8"
 - Forward lunges
 - Begin walking program on treadmill
 - Open kinetic chain knee extension (0-90°)
 - Bicycle
 - Stairmaster
 - Swimming
 - Nordic-Trak/elliptical

- Functional Activities:
- As patient improves, increase walking (distance, cadence, incline, etc.)

- Maintenance Program:
- Initiate at week 16-20
 - Bicycle – low resistance
 - Progressive walking program
 - Pool exercises for entire lower extremity
 - Straight leg raises into flexion

- Leg press
- Wall squats
- Hip abduction/adduction
- Front lunges
- Stretch quadriceps, hamstrings, gastroc

PHASE IV - FUNCTIONAL ACTIVITIES PHASE (WEEKS 26-52)

Goals: - Gradual return to full unrestricted functional activities

Criteria to Progress
to Phase IV:

- Full non-painful ROM
- Strength within 90% of contralateral extremity
- Balance and/or stability within 75% of contralateral extremity
- No pain, inflammation, or swelling

Exercises:

- Continue maintenance program progression 3-4x/week
- Progress resistance as tolerated
- Emphasis on entire lower extremity strength & flexibility
- Progress agility and balance drills
- Impact loading program should be specialized to the patient's demands
- 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 skating, rollerblading, and cycling are permitted at about 6-8 months. Higher impact sports such as jogging, running, and aerobics may be performed at 8-10 months. High impact sports such as tennis, basketball, and baseball are allowed at 12-18 months.