

# OSTEOCHONDRAL AUTOGRAFT 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 (>5cm<sup>2</sup>) 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

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## 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

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## 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

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## 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.