

# **Rehabilitation Following Microfracture Procedure**

## **Phase 1: Proliferation Phase (weeks 0-4)**

### Goals

- Protect healing tissue from load and shear forces
- Decrease pain and effusion
- Restoration of full passive knee extension
- Gradually restore knee flexion
- Regain quadriceps control

### Brace

- No brace; may use elastic wrap to control swelling

### Weight Bearing (WB)

- WB status varies based on lesion location and size
- For medium to large femoral condyle lesions (> 2.0 cm<sup>2</sup>): non-WB for 2 weeks; begin toe touch WB (approximately 9.1-13.6 kg) at week 3; progress to partial WB (approximately ¼ body weight) at week 4
- For small femoral condyle lesion (< 2.0 cm<sup>2</sup>): immediate toe-touch WB (per physician) (approximately 9.1-13.6 kg) at weeks 0-2; progress to 50% WB by week 3; 75% WB by week 4
- For patellofemoral lesions: immediate toe-touch WB of approximately 25% body weight with brace locked in full extension; progress to 50% WB by week 2 and 75% WB at week 3 with brace locked in full extension, full WB by week 4

### Range of Motion (ROM)

- Immediate motion exercise day 1
- Full passive knee extension immediately
- Initiate CPM day 1 for total of 8-12 hours/d (0°-60°; if patellofemoral lesion is > 6.0 cm<sup>2</sup>, 0°-40°)
- Progress CPM/ROM as tolerated 5°-10° per day
- May continue CPM for total of 6-8 hours per day for up to 6 weeks
- Patellar mobilization (4-6 times per day)
- Motion exercise throughout the day
- Passive knee flexion ROM at least 2-3 times daily
- Progressive passive knee ROM as tolerated, no restrictions
- Minimum ROM goals: 0°-90° week 1, 0°-105°-week 2, 0°-115° week 3, and 0°-125° week 4
- Stretch hamstrings and calf

### Strengthening Program

- Ankle pump using elastic tubing
- Quadriceps setting
- Multiangle isometrics (co-contractions Q/H)
- Active knee extension 90°-40° for femoral condyle lesions ( no resistance), avoid for Patellofemoral lesions
- Straight leg raises (4 directions)
- Electrical muscle stimulation and/or biofeedback during quadriceps exercises

- Initiate weight shifting exercises with knee in extension by week 1-2 for patellofemoral lesions and small femoral condyle lesions, at week 3 for larger femoral condyle lesions
- Leg press 0°-60° by week 3 for small femoral condyle lesions and patellofemoral lesions, progress to 0°-90° by week 4
- Toe calf raises by week 4 for small femoral condyle and patellofemoral lesions
- May begin use of pool for gait training and exercises by week 3-4 (when incision is fully healed)
- May begin stationary bike by weeks 3-4, low resistance
- No active knee extension exercises for patellofemoral lesions

#### Functional Activities

- Gradual return to daily activities
- If symptoms occur, reduce activities to reduce pain and inflammation

#### Swelling Control

- Ice, elevation, compression, and modalities as needed

#### **Criteria to Progress to Phase 2**

- Full passive knee extension
- Knee flexion to 125°
- Minimal pain and swelling
- Voluntary quadriceps activity

#### **Phase II: Transition Phase (weeks 4-8)**

##### Goals

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

##### WB

- Progress WB as tolerated
- For large femoral condyle lesions: ½ body weight with crutches: 75% WB week 7; progress to full WB at 8 weeks, discontinue crutches

##### ROM

- Gradual increase in ROM
- Maintain full passive knee extension
- Progress knee flexion to 135° + by week 8
- Continue patellar mobilization and soft-tissue mobilization as needed
- Continue stretching program

##### Strengthening Exercises

- Progress WB exercises
- Initiate leg press for large femoral condyle lesions by week 6
- Mini-squats 0°-45° by week 8 for femoral condyle lesions
- Toe-calf raises by week 8 for femoral condyle lesions
- Progress balance and proprioception drills

- Initiate front lunges, wall squats and front and lateral step-ups week 5 for small femoral condyle and patellofemoral lesions, week 8 for large femoral condyle lesions
- For femoral condyle lesions, progress non-WB knee extension, 0.45kg/wk
- For patellofemoral lesion, may begin non-WB knee extension without resistance in a ROM that does not allow for articulation of the lesion
- Continue stationary bicycle, low resistance (gradually increase time)
- Continue use of electrical muscle stimulation and/or biofeedback as needed
- Continue use of pool for gait training and exercise

#### Functional Activities

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

#### **Criteria to Progress to Phase 3**

- Full ROM
- Acceptable strength level
- Hamstring within 20% of contralateral extremity
- Quadriceps within 30% of contralateral extremity
- Balance testing within 30% of contralateral extremity
- Able to bike for 30 min

#### Phase III: Remodeling Phase (weeks 8-16)

##### Goals

- Improve muscular strength and endurance
- Increase functional activities

##### ROM

- Patient should exhibit 125°-135° + flexion

##### Exercise Program

- Leg press (0°-90°)
- Bilateral squats (0°-60°)
- Unilateral step-ups progressing from 5.1 to 20.3 cm
- Forward lunges
- Walking program week 10
- Progress non-WB extension (0°-90°); for patellofemoral lesions, may begin at week 12, perform from 90°-40° or avoid angle where lesion articulates; progress 0.45kg every 2 weeks, beginning week 20 if no pain or crepitation occurs, must monitor symptoms
- Continue progressing balance and proprioception
- Bicycle
- Stairmaster
- Swimming
- Nordic-Track/elliptic

### Functional Activities

- Increase walking (distance, cadence, incline, etc.)

### Maintenance Program

- Initiate at weeks 12-16
- Bicycle: low resistance, increase time
- Progressive walking program
- Pool exercises for entire lower extremity
- Straight leg raises
- Leg press
- Wall squats
- Hip strengthening (abduction/adduction)
- Front lunges
- Step-ups
- Stretch quadriceps, hamstrings, calf

### **Criteria to Progress to Phase 4**

- Full nonpainful ROM
- Strength within 80%-90% of contralateral extremity
- Balance and/or stability within 75%-80% of contralateral extremity
- No pain, inflammation, or swelling

### **Phase IV: Maturation Phase (weeks 16-26)**

#### Goals

- Gradual return to full unrestricted functional activities

#### Exercises

- Continue maintenance program progression 3-4 time per week
- Progress resistance as tolerated
- Emphasis on entire lower extremity strength and flexibility
- Progress agility and balance drills
- Impact loading program should be individualized to the patient's need
- Progress sport program 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 2 months for small femoral condyle and patellofemoral lesions and at 3 months for large femoral condyle lesions. Higher-impact sports, such as jogging, running, and aerobics may be performed at 4 months for small lesions or 5 months for larger lesions. High-impact sports, such as tennis, basketball, football, and baseball, are allowed at 6-8 months.