



## REHABILITATION GUIDELINES

### **Distal Femoral Osteotomy**

**Edward S. Chang, MD**  
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#### **CLINICAL NURSE**

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The rehabilitation guidelines are presented in a criterion based progression program. General time frames are given for reference to the average, but individual patients will progress at different rates depending on their age, associated injuries, pre-injury health status, rehab compliance, tissue quality and injury severity. Specific time frames, restrictions and precautions may also be given to protect healing tissues and the surgical repair/reconstruction.

#### **INDIVIDUAL CONSIDERATIONS:**

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### **Phase I: Immediate Post-operative (Weeks 0 to 6)**

#### **Goals**

- Protect healing tissue
- Control pain and edema
- Obtain full knee extension
- Restore knee flexion
- Regain quadriceps control
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#### **Weight Bearing**

- Toe touch weight bearing for six weeks
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#### **Range of Motion**

- No immediate limitation on passive range of motion (below are minimum recommendations)
- 0 to 90 degrees at week one
- 0 to 110 degrees at week two
- 0 to 120 degrees at week three
- Progress to full range of motion at week four
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#### **Exercises**

- Full passive knee extension
- Patellar mobilizations
- Range of motion exercises
- Ankle pumps
- Quad sets (neuromuscular electrical stimulation as needed)
- Four-way straight leg raises (abduction and adduction done in brace to avoid varus and valgus stresses)
- Stationary bike
- Hamstring, quad, calf and hip flexor stretching
- Core exercises



- Cryotherapy with elevation for pain and inflammation every hour for 20 minutes

## **Phase II: Intermediate (Weeks 6 to 12)**

### **Criteria to Progress to Phase II**

- Minimal pain and swelling
- Full knee extension and improving flexion

### **Goals**

- Progress weight bearing per bone healing
- Restore full range of motion
- Improve quadriceps strength and endurance

### **Weight Bearing**

- 25 percent weight bearing with two crutches at week six
- 50 percent weight bearing with two crutches at week seven
- 75 percent weight bearing with two crutches at week eight
- Progress to full weight bearing at week nine (wean from crutches as gait normalizes)

### **Brace**

- Open brace to range of motion obtained comfortably by patient
- Sleep in locked brace for two to four weeks
- Discontinue brace when patient has obtained good quad control

### **Exercises**

- Continue exercises as listed above
- Four-way straight leg raises (without brace, progressing weight)
- Initiate weight bearing exercises per weight bearing restrictions
- Isometric leg press
- Weight shifts
- Toe raises
- Mini squats
- Pool for gait training
- Proprioception activities
- Core progression
- Continue cryotherapy for pain management

## **Phase III: Advanced Activity (Weeks 13 to 20)**

### **Criteria to Progress to Phase III**

- Full range of motion
- Minimal pain and edema
- Improved functional strength and endurance

### **Goals**

- Improve functional activity
- Improve muscular strength, flexibility and endurance

### **Exercises**

- Continue exercises as listed above
- Leg press
- Step ups

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- Lateral step downs
- Wall squats
- Lunges
- Terminal knee extensions
- Hamstring curls
- Lateral walks with resistance
- Long arc quads (90 to 40 degrees)
- Walking program on treadmill
- Swimming
- Elliptical/NordicTrak
- StairMaster at week 16

**Phase IV: Functional Activities (Months 5 to 8)**

**Criteria to Progress to Phase IV**

- Full, non-painful range of motion
- Strength within 80 percent of contralateral side
- Good proprioception
- No pain, inflammation or swelling

**Goals**

- Gradual return to unrestricted functional activities

**Functional Activities**

- Patient may return to various sport activities as progressing in rehabilitation and osteotomy healing allows.
  - **4 to 6 Months:** Low impact sports such as golf, swimming, skating, roller-blading and cycling
  - **6 to 8 Months:** Higher impact sports such as running, jogging and aerobics
  - **8 to 12 Months:** High impact sports such as tennis, basketball, football and baseball
  -

**Exercises**

- Continue maintenance program three to four times a week
- Progress resistance as tolerated
- Initiate jogging program (see below)
- Initiate agility and balance drills (see below)
- Impact loading program should be specialized to the patient's demands
- Progress sport programs depending on patient variables



## REHABILITATION GUIDELINES

### **Return to Running Program**

#### **Phase I – Warm Up Walk 15 Minutes, Cool Down Walk 10 Minutes**

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Day	1	2	3	4	5	6	7
<b>Week 1</b>	<b>W5/J1x5*</b>		<b>W5/J1x5</b>		<b>W4/J2x5</b>		<b>W4/J2x5</b>
<b>Week 2</b>		<b>W3/J3x5</b>		<b>W3/J3x5</b>		<b>W2/J4x5</b>	
<b>Week 3</b>	<b>W2/J4x5</b>		<b>W1/J5x5</b>		<b>W1/J5x5</b>		<b>Return to Run</b>

Key: W=walk, J=jog

\*W5/J1x5= Walk (5 minutes), Jog (1 minute); repeat 5 times

#### **Phase II – Warm Up Walk 15 Minutes, Cool Down Walk 10 Minutes**

Week	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
<b>1</b>	<b>20 min</b>		<b>20 min</b>		<b>20 min</b>		<b>25 min</b>
<b>2</b>		<b>25 min</b>		<b>25 min</b>		<b>30 min</b>	
<b>3</b>	<b>30 min</b>		<b>30 min</b>		<b>35 min</b>		<b>35 min</b>
<b>4</b>		<b>35 min</b>		<b>40 min</b>		<b>40 min</b>	
<b>5</b>	<b>40 min</b>		<b>45 min</b>		<b>45 min</b>		<b>45 min</b>
<b>6</b>		<b>50 min</b>		<b>50 min</b>		<b>50 min</b>	
<b>7</b>	<b>55 min</b>		<b>55 min</b>		<b>55 min</b>		<b>60 min</b>
<b>8</b>		<b>60 min</b>		<b>60 min</b>			

- Recommendations:
  - Runs should occur on softer surfaces during Phase 1
  - Non-impact activity on off days
  - Goal is to increase mileage and then increase pace; avoid increasing two variables at once
  - 10% rule: no more than 10% increase in mileage per week



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### **AGILITY AND PLYOMETRICS PROGRAM**

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#### PHASE I: ANTERIOR PROGRESSION

##### **Goals:**

- Safely recondition the knee
- Provide a logical sequence of progressive drills for pre-sports conditioning

##### **Agility:**

- Forward run
- Backward run
- Forward lean in to a run
- Forward run with 3-step deceleration
- Figure 8 run
- Circle run
- Ladder

##### **Plyometrics:**

- Shuttle press: Double leg → alternating leg → single leg jumps
- Double leg:
  - Jumps on to a box → jump off of a box → jumps on/off box
  - Forward jumps, forward jump to broad jump
  - Tuck jumps
  - Backward/forward hops over line/cone
- Single leg (these exercises are challenging and should be considered for more advanced athletes):
  - Progressive single leg jump tasks
  - Bounding run
  - Scissor jumps
  - Backward/forward hops over line/cone

##### **Criteria to Progress:**

- No increase in pain or swelling
- Pain-free during loading activities
- Demonstrates proper movement patterns

#### PHASE II: LATERAL PROGRESSION

##### **Goals:**

- Safely recondition the knee
- Provide a logical sequence of progressive drills for the Level 1 sport athlete

##### **Agility (\*Continue with Phase 1 interventions):**

- Side shuffle
- Carioca
- Crossover steps



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- Shuttle run
- Zig-zag run
- Ladder

**Plyometrics:**

- Double leg:
  - Lateral jumps over line/cone
  - Lateral tuck jumps over cone
- Single leg (these exercises are challenging and should be considered for the more advanced athletes):
  - Lateral jumps over line/cone
  - Lateral jumps with sport cord

**Criteria to Progress:**

- No increase in pain or swelling
- Pain-free during loading activities
- Demonstrates proper movement patterns

**PHASE III: MULTI-PLANAR PROGRESSION**

**Goals:**

- Challenge athlete in preparation for final clearance for return to sport

**Agility:**

- Box drill
- Star drill
- Side shuffle with hurdles

**Plyometrics:**

- Box jumps with quick change of direction
- 90 and 180 degree jumps

**Criteria to Progress:**

- Clearance from MD
- Functional Assessment
  - $\geq 90\%$  contralateral side
- Return to Sport Index