

**Orthopedic Surgery • Sports Medicine**  
*Neil Kumar, MD*

## **Osteotomy Protocol**

“As tolerated” should be understood to “perform with safety” for the reconstruction/repair. Pain, limp, swelling, or other undesirable factors are indicators that you are doing too much too soon. If any of these should occur, decrease your activity level, elevate the leg, and ice your knee.

Ice should be applied to the knee for 15 to 20 minutes following each exercise, therapy, or training session. While your knee remains swollen, icing should also be done separate from exercise sessions at least three times per day.

All times and exercises are to serve as guidelines only. Progression through the protocol should be based upon criteria as opposed to dates listed and will vary depending on each individual patient. Progress should be agreed upon by the patient and his/her team of providers.

### **Pre-Operative**

- Brace – As directed by your doctor
- Weight Bearing – Full, use crutches as necessary
- ROM (range of motion) – Full, no restrictions
- Therapeutic Exercise - Learn exercises for post op regimen
  - Calf stretching
  - Quad sets
  - Four-way straight leg raises (SLR)
  - Heel slides
  - ‘Propped’ knee extension
- Modalities - Cryotherapy (Ice) six to eight times per for 15 to 20 minutes each time
  
- **Goals for Surgery**
  - Minimal to no swelling
  - Full ROM
  - Normal strength

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### **Post-Operative Phase I: Weeks 1 - 6**

***\*\*\*Include single-leg exercises on non-involved side\*\*\****

- Brace
  - Locked at 0<sup>0</sup> for ambulation, 90<sup>0</sup> when non-ambulatory
- Weight Bearing
  - Toe-touch weight bear with bilateral (2) crutches
- ROM
  - 0° to 90° active and passive
- Therapeutic Exercise - *All exercises without weight*
  - 'Preoperative' exercises
  - Straight leg raises
  - Glute sets
  - Ankle pumps
  - Quad sets
  - Hamstring sets
  - Wall slides
- Modalities
  - Scar and soft tissue massage, patella mobilizations
  - NMES (neuromuscular electrical stimulation) for quadriceps atrophy
  - HVPC (high volt pulsed current) for effusion (swelling) reduction
  - Cryotherapy six to eight times per day for 15 to 20 minutes each
- Proprioception
  - Seated BAPS board
- Cardio - UBE (arm bike)
  
- **Goals for Phase II:**
  - Hip flexion SLR without knee extension lag
  - Knee ROM 0<sup>0</sup> – 90<sup>0</sup>
  - No pain
  - No swelling or effusion

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### **Post-Operative Phase II: Weeks 6 - 12**

***\*\*\*Progression of weight bearing determined from radiographic healing\*\*\****

- Brace - Unlocked
- Weight Bearing
  - Week 6 – Weight bearing as tolerated with bilateral (2) crutches
  - Week 8 – Transition to full weight bearing without crutches with brace
  - Week 10 - Transition to full weight bearing without brace
- ROM - Full active and passive
- Therapeutic Exercises – Continue Phase I exercises
  - Standing hamstring curls
  - CKC and OKC quad and hamstring exercises within pain-free ROM
- Modalities
  - Scar and soft tissue massage, patella mobilizations
  - NMES (neuromuscular electrical stimulation) for quadriceps atrophy
  - HVPC (high volt pulsed current) for effusion (swelling) reduction
  - Cryotherapy six to eight times per day for 15 to 20 minutes each
- Proprioception
  - Seated BAPS board
  - Standing weight shifts
  - Joint repositioning
- Cardio
  - UBE
  - Stationary bike with increasing resistance
  - Pool walking progressing to running
- **Goals for Phase III:**
  - Normal gait
  - Knee ROM 0°- 120°
  - Good eccentric control of involved knee without brace
  - Isokinetic quad strength 80% of non-involved side
  - Isokinetic hamstring strength 100% of non-involved side

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### **Post-Operative Phase III: Weeks 12 - 16**

- Brace - Unlocked
- Weight Bearing - Full
- ROM - Full active and passive
- Therapeutic Exercises – Continue Phase II exercises
  - Double-leg plyometrics progressing to single leg as tolerated
  - Progressive squats and leg press with increasing flexion
  - CKC anterior/lateral lunges with increasing knee flexion
  - Stair stepper (start at 2”)
- Modalities
  - Scar and soft tissue massage, patella mobilizations
  - NMES (neuromuscular electrical stimulation) for quadriceps atrophy
  - HVPC (high volt pulsed current) for effusion (swelling) reduction
  - Cryotherapy six to eight times per day for 15 to 20 minutes each
- Proprioception
  - Standing weight shifts
  - Unstable surfaces
  - Joint repositioning
  - Perturbation training (balance against resistance)
- Cardio
  - UBE
  - Stationary bike with resistance
  - Pool running
  - Swimming
- **Goals for Phase III:**
  - Normal gait
  - Knee ROM 0°- 120°
  - Good eccentric control of involved knee without brace
  - Isokinetic quad strength 90% of non-involved side
  - Isokinetic hamstring strength 100% of non-involved side

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### **Post-Operative Phase III: After Week 16**

Transitional Therapy for return to sport activities during this phase with progression based upon patient progress through earlier protocol.

- Initiate treadmill ambulation progressing to running at 4 months
- Initiate cutting/pivoting/jump training at 5 months

In addition to ongoing strength, balance, agility, and cardio conditioning, initiate sport specific plyometric activities as tolerated such as:

Soccer/Football: Two foot ankle hop, double-leg hop, front barrier hop, lateral barrier hop, single-leg hop, power skip, backward skip, double arm alternate leg bound, and cycled split squat jump

Basketball/Volleyball: Two foot ankle hop, double-leg hop, squat jump, double-leg vertical jump, single-leg hop, single-leg vertical jump, power skip, backwards skip, double-arm alternate-leg bound, alternate leg push off box drill, and side-to-side push off box drill

Baseball/Softball/Overhead throwing sports: Two foot ankle hops, double-leg hop, front barrier hop, lateral barrier hop, single-leg hop, power skip, backward skip, double arm alternate leg bound, cycled split squat jump, and return to throwing program

### **Return to Sports**

Return to sports is based on provider team (physician, physician assistant, athletic trainer, therapist) input. At 6 month follow-up with provider, clinical exam, isometric and isokinetic testing will be used to determine optimal timing for jump/hop functional test. Transitional Therapy should continue during this time as the patient prepares to return to sports and athletic activities.

Clearance for return to full sports activities will be determined with input from the entire health team. When cleared by the provider, patients should return to their sports with a *4-week progression plan* as determined by the health team and coaches. This allows the athlete to acclimate to the mental and physical demands of sports and athletics in safe manner.