

**Orthopedic Associates of Hartford, P.C.**  
**J. Kristopher Ware, M.D/ Nicole Lavette, APRN**  
31 Seymour St #100      Date of Surgery:  
Hartford, CT 06106  
Phone: 860-244-1017, Fax: 860-524-8965  
[www.oahct.com](http://www.oahct.com)

---

## **Post-Operative Rehabilitation Protocol:**

### **Anterior Cruciate Ligament (ACL) Reconstruction – Bone-Tendon-Bone Autograft**

#### **PHASE I: IMMEDIATE POST-OPERATIVE PHASE (WEEKS 0-2)**

GOALS: Decrease swelling, pain control, prevent quad atrophy.

#### **I. Immediate Post-Operative to Week 2:**

##### **A. General:**

- \* Brace locked in full extension. May remove for shower/bathing.
- \* Elevate knee above heart level often
- \* Cryotherapy unit or ice 20 minutes/hour

##### **B. Weight Bearing:**

- \* WBAT in brace locked in full extension, two crutches

##### **C. Range of Motion Goals:**

- \* Active/passive ROM 0°-90°, 4-5 times per day

##### **D. Treatment / Exercises:**

- \* Ankle pumps, Theraband ankle exercises
- \* Gentle patellar mobilization/scar mobilization
- \* VMO quad sets with biofeedback
- \* Multi-angle quad isometrics (90°, 60°, 30°)
- \* EMS especially important if patient unable to initiate quad sets or independent SLR
- \* Straight leg raises – 4 directions
- \* Standing weight shifts
- \* Gastroc/hamstring stretching
- \* Passive knee extension to 0° - towel under heel, bridge hang for full extension
- \* ***NO open chain concentric quads***

## **PHASE II – MAXIMUM PROTECTION PHASE (WEEKS 2-6)**

GOALS: Protect healing tissue, improve motion, decrease swelling, pain control, prevent muscle atrophy, improve ambulation.

Enter Phase II if:

- ✓ PROM 0°-90°
- ✓ Full passive knee extension
- ✓ Good patellar mobility
- ✓ Able to perform SLR
- ✓ Minimal pain/swelling
- ✓ Independent ambulation/transfers

### **II. Weeks 2-4:**

#### **A. General:**

- \* Cryotherapy unit or ice 20 minutes/hour at patient's discretion

#### **B. Weight Bearing:**

- \* Progress in WB status in brace. May unlock brace for ambulation when adequate quad control. Wean from crutches as quad control allows.

#### **C. Range of Motion Goals:**

- \* PROM 0° – 115°

#### **D. Treatment / Exercises:**

- \* Continue previous treatment / exercises
- \* Isotonic program hip abduction/adduction
- \* Leg curls
- \* Mini squats 0°-30°
- \* Wall slides 0°-30°
- \* Posterior tibial glide joint mobilization at 30° and 90° if ROM problem persists, especially in extension
- \* Bicycle for ROM – ½ arcs progressing to full ROM
- \* Balance/proprioception training
- \* Well leg exercises
- \* SLR in 4 planes with 1 lb. Increase lb per week
- \* Aggressive patella and soft tissue mobilization
- \* ***NO open chain concentric quads***

### **III. Weeks 4-6:**

#### **A. General:**

- \* Brace unlocked and will discontinue at follow up visit
- \* Ice 20 minutes/hour at patient's discretion

#### **B. Weight bearing:**

\* WBAT

C. ROM goals:

\* PROM/AROM 0°-135° (or match uninvolved knee)

D. Treatment / Exercises:

- \* Continue with previous treatment
- \* Continue isotonic program (hips, hamstrings, leg press)
- \* Heel walking/toe walking
- \* Treadmill forward and backward walking
- \* Stairmaster, Elliptical trainer
- \* Pool walking
- \* Eccentric quads 40°-100°
- \* Quad/hamstring stretching
- \* Patellar mobilization
  - \* Cross friction massage
  - \* Biofeedback for neuromuscular VMO re-education
  - \* Interval stationary bike program for ROM/endurance
  - \* ***NO open chain concentric quads***

**PHASE III: MODERATE PROTECTION PHASE (WEEKS 6-12)**

GOALS: Increase strength, improve motion, protect reconstruction.

Enter Phase III if:

- ✓ Minimal pain/swelling
- ✓ AROM at least 0°-115°
- ✓ Voluntary quadriceps control
- ✓ Quad strength at least 60% of uninvolved leg

**IV. Weeks 6-10:**

A., B., C. As above

D. Treatment / Exercises:

- \* Continue with previous treatment
- \* Initiate swimming program
  - \* Pool running
  - \* Increase closed kinetic chain rehab
  - \* Step ups (start with 2" and increase gradually)
  - \* Isotonic squats – Smith Machine bar weight only
  - \* Lunges
  - \* Trampoline
  - \* Stepping high knee
  - \* Increase Proprioceptive training
  - \* Weight shifting forward, sideways, diagonally

\* **NO** open chain concentric quads

## **V. Weeks 10-12:**

A., B., C. As above

### **D. Treatment / Exercises:**

- \* Continue with previous treatment
- \* Emphasize eccentric quad exercises
- \* Hamstring curls/stretchers
- \* Walking program
- \* Isokinetic limited range (100°-40°), high speed above 150-180°/sec at 10 weeks

## **PHASE IV: LIGHT ACTIVITY PHASE (MONTHS 3-4)**

GOALS: Develop strength, power, and endurance. Begin to prepare for return to functional activities.

Enter Phase IV if:

- ✓ Minimal pain/tenderness
- ✓ Minimal swelling
- ✓ AROM at least 0°-125°
- ✓ Quad strength at least 75% of uninjured leg

## **VI. Months 3-4:**

A., B., C. As above

### **D. Treatment / Exercises:**

- \* Continue with previous treatment
- \* Isotonic terminal knee extension, low resistance high repetition
- \* Initiate plyometric program
- \* Initiate agility drills
- \* Trampoline jogging
- \* Low intensity impact activities
- \* Sport specific drills
- \* Functional closed chain evaluation
- \* Perform Isokinetic test
- \* Controlled slow forward and backward jogging on level surface
- \* Initiate running program if:
  - Satisfactory isokinetic test
    - Quads - 85% > of opposite leg
    - Hamstring - 90% > of opposite leg
    - Isokinetic test - quad torque/body weight (180 o/s)  
60-65% males, 50-55% females

- Stable ligamentous exam
- Functional test at least 70% of uninvolved leg

### **PHASE V: RETURN TO ACTIVITY PHASE (MONTHS 5-6)**

GOALS: Achieve maximal strength, Enhance neuromuscular coordination and endurance. Prepare for competitive activity.

Enter Phase V if:

- ✓ No pain/swelling
- ✓ Full ROM
- ✓ Strength at least 80% of uninvolved leg
- ✓ Proprioceptive test 100% of uninvolved leg

### **VII. Months 5-6:**

A., B., C. As above

#### **D. Treatment / Exercises:**

- \* Continue with previous treatment
- \* Continue closed chain strengthening
- \* Broad jump, Vertical jump
- \* Advance sport-specific drills
- \* Agility limits

### **PHASE VI: RETURN TO ACTIVITY (MONTHS 7-9)**

GOALS: Prepare for complete return to activity

Enter Phase VI if:

- ✓ No pain/tenderness
- ✓ Full ROM
- ✓ Strength at least 90% of uninvolved leg

### **VIII. Months 7-9:**

A., B., C. As above

#### **D. Treatment / Exercises:**

- \* Continue with previous treatment
- \* Plyometrics medium to high intensity
- \* Progress sport specific drills/ practice
- \* Return to full activity/ sports individualized
- \* Formal risk assessment/ testing for competitive athletes

### **\* Addendum**

This protocol provides general rehabilitation guidelines following ACL reconstruction procedures with Bone-Tendon-Bone Autograft. It is subject to modification depending on several factors the degree of injury, the type and extent of associated surgical intervention, as well as your individual progress post-operatively. For any questions, please call my office at 860-244-1017.