



Michael S. Day, MD, MPhil  
WellSpan Orthopedics  
120 North Seventh Street, Chambersburg, PA 17201, Suite 101  
Tel: (717) 263-1220 Fax: (717) 263-6255

## Rehabilitation Protocol: ACL Reconstruction with MCL Repair or Reconstruction

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Diagnosis: \_\_\_\_\_ Date of Surgery: \_\_\_\_\_

ACL Recon w/Hamstring Autograft       ACL Recon w/ Hamstring Allograft  
 ACL Recon w/Patellar Tendon Autograft       ACL Recon w/Patellar Tendon Allograft  
 MCL repair       MCL reconstruction with allograft       MCL reconstruction with autograft

Early range of motion permitted in range from 0 to \_\_\_\_\_

Treatment Frequency: 3 times per week      Duration of Therapy Prescription: 8 weeks

**General Information:** The following ACL rehabilitation guidelines are based on a review of the randomized controlled trials related to ACL rehabilitation. They have been adapted from the M.O.O.N (Multicenter Orthopaedics Outcomes Network) group sports medicine collaborative consensus statement related to evidence-based ACL rehabilitation. The guidelines have been developed to service the spectrum of ACL injured people (non-athlete ↔ elite athlete). For this reason, **example exercises** are provided instead of a highly structured rehabilitation program. **Attending rehabilitation specialists should tailor the program to each patient's specific needs.**

Progression from one phase to the next is based on the patient demonstrating readiness by achieving **functional criteria rather than the time elapsed since surgery**. The timeframes identified in parentheses after each Phase are *approximate* times for the average patient, **NOT** guidelines for progression. Some patients will be ready to progress sooner than the timeframe identified, whereas others will take longer.

The *recommended* number of visits to the rehabilitation specialist (including visits merely for evaluation / exercise progression) is **16 to 24** visits with the majority of the visits occurring early (**BIW x 6 weeks**). However, it is recognized that some patient's health plans are severely restrictive. For this reason, the *minimum* number of post-ACL reconstruction visits to a rehabilitation specialist should not be less than **6 visits**.

### Modifications to ACL rehabilitation protocol for MCL repair/reconstruction:

- Non-weight bearing for 6 weeks
- Start ROM immediately, in safe zone determined intra-operatively. After 2 weeks, ROM as tolerated
- Start quad sets and patella mobilization immediately post op

- After weight-bearing begins, limit leg press to 70 degrees knee flexion until 3 months
- Begin strength and proprioceptive training at 16-20 weeks
- return to sport based on functional tests and MD clearance

## **PHASE 1: Immediate Post-operative Phase** (Approximate timeframe: Surgery to 2 weeks)

### **GOALS**

- Full knee extension ROM
- Good quadriceps control ( $\geq 20$  reps no lag SLR)
- Minimize pain
- Minimize swelling
- Normal gait pattern

**Crutch Use:** NWB with crutches (beginning the day of surgery)

**Crutch D/C Criteria:** 6 weeks NWB.

Normal gait pattern

Ability to safely ascend/descend stairs without noteworthy pain or

Instability (reciprocal stair climbing)

**Knee brace:** First week: ROM as specified by MD. Maintained until extensor lag gone

**Cryotherapy:** Cold with compression/elevation (e.g. Cryo-cuff, ice with compressive stocking)

- First 24 hours or until acute inflammation is controlled: every hour for 15 minutes
- After acute inflammation is controlled: 3 times a day for 15 minutes

### **EXERCISE SUGGESTIONS:**

#### **ROM**

- *Extension:* Low load, long duration (~5 minutes) stretching (e.g., heel prop, prone hang minimizing co-contraction and nociceptor response)
- *Flexion:* Wall slides, heel slides, seated assisted knee flexion, bike: rocking-for-range
- Patellar mobilization (medial/lateral mobilization initially followed by superior/inferior direction while monitoring reaction to effusion and ROM)

#### **Muscle Activation/Strength**

- Quadriceps sets emphasizing vastus lateralis and vastus medialis activation
- SLR emphasizing no lag
- **Electric Stimulation:** *Optional* if unable to perform no lag SLR

**Discontinue** use when able to perform *20 no lag SLR*

- Double-leg quarter squats
- Standing theraband resisted terminal knee extension (TKE)
- Hamstring sets
- Hamstring curls
- Side-lying hip adduction/abduction (Avoid adduction moment in this phase with concomitant grade II – III MCL injury)
- Quad/ham co-contraction supine
- Prone Hip Extension
- Ankle pumps with theraband
- Heel raises (calf press)

#### **Cardiopulmonary**

- UBE or similar exercise is recommended

**Scar Massage** (when incision is fully healed)

#### **CRITERIA FOR PROGRESSION TO PHASE 2**

- 20 reps no lag SLR
- Normal gait
- Crutch/Immobilizer D/C (crutch use D/C at 6 weeks for MCL)
- ROM: no greater than 5° active extension lag, 110° active flexion

## **PHASE 2: Early Rehabilitation Phase** (Approximate timeframe: weeks 2 to 6)

**\*\*\*MCL: no weight bearing exercises first 6 weeks\*\*\***

### **GOALS**

- Full ROM
- Improve muscle strength
- Progress neuromuscular retraining

### **EXERCISE SUGGESTIONS**

#### **ROM**

- Low load, long duration (assisted prn)
- Heel slides/wall slides
- Heel prop/prone hang (minimize co-contraction / nociceptor response)
- Bike (rocking-for-range → riding with low seat height)
- Flexibility stretching all major groups

#### **Strengthening**

##### *Quadriceps:*

- Quad sets
- Mini-squats/wall-squats
- Steps-ups
- Knee extension from 90° to 40°
- Leg press
- Shuttle **Press without jumping action**

##### *Hamstrings:*

- Hamstring curls
- Resistive SLR with sports cord

##### *Other Musculature:*

- Hip adduction/abduction: SLR or with equipment
- Standing heel raises: progress from double to single leg support
- Seated calf press against resistance
- **Multi-hip machine in all directions with proximal pad placement**

#### **Neuromuscular training**

- Wobble board
- Rocker board
- Single-leg stance with or without equipment (e.g. instrumented balance system)
- Slide board
- Fitter

#### **Cardiopulmonary**

- Bike
- Elliptical trainer
- Stairmaster

### **CRITERIA FOR PROGRESSION TO PHASE 3**

- Full ROM
- Minimal effusion/pain

- Functional strength and control in daily activities

### **PHASE 3: Strengthening & Control Phase** (Approximate timeframe: weeks 7 through 12)

#### **GOALS**

- Maintain full ROM
- Running without pain or swelling
- Hopping without pain, swelling or giving-way

#### **EXERCISE SUGGESTIONS**

##### **Strengthening**

- Squats
- Leg press
- Hamstring curl
- Knee extension 90° to 0°
- Step-ups/down
- Lunges
- Shuttle
- Sports cord
- Wall squats

##### **Neuromuscular Training**

- Wobble board / rocker board / roller board
- Perturbation training
- Instrumented testing systems
- Varied surfaces

##### **Cardiopulmonary**

- Straight line running on treadmill or in a protected environment (NO cutting or pivoting)
- All other cardiopulmonary equipment

#### **CRITERIA FOR PROGRESSION TO PHASE 4**

- Running without pain or swelling
- Hopping without pain or swelling (Bilateral and Unilateral)
- Neuromuscular and strength training exercises without difficulty

## **PHASE 4: Advanced Training Phase** (Approximate timeframe: weeks 13 to 16)

### **GOALS**

- Running patterns (Figure-8, pivot drills, etc.) at 75% speed without difficulty
- Jumping without difficulty
- Hop tests at 75% contralateral values (Cincinnati hop tests: single-leg hop for distance, triple-hop for distance, crossover hop for distance, 6-meter timed hop)

### **EXERCISE SUGGESTIONS**

#### **Aggressive Strengthening**

- Squats
- Lunges
- Plyometrics

#### **Agility Drills**

- Shuffling
- Hopping
- Carioca
- Vertical jumps
- Running patterns at 50 to 75% speed (e.g. Figure-8)
- Initial sports specific drill patterns at 50 – 75% effort

#### **Neuromuscular Training**

- Wobble board / rocker board / roller board
- Perturbation training
- Instrumented testing systems
- Varied surfaces

#### **Cardiopulmonary**

- Running
- Other cardiopulmonary exercises

#### **CRITERIA FOR PROGRESSION TO PHASE 5**

- Maximum vertical jump without pain or instability
- 75% of contralateral on hop tests
- Figure-8 run at 75% speed without difficulty

**PHASE 5: Return-to-Sport Phase** (Approximate timeframe: weeks 17 to 24)

**GOALS**

- 85% contralateral strength
- 85% contralateral on hop tests
- Sport specific training without pain, swelling or difficulty

**EXERCISE SUGGESTIONS**

**Aggressive Strengthening**

- Squats
- Lunges
- Plyometrics

**Sport Specific Activities**

- Interval training programs
- Running patterns in football
- Sprinting
- Change of direction
- Pivot and drive in basketball
- Kicking in soccer
- Spiking in volleyball
- Skill / biomechanical analysis with coaches and sports medicine team

**RETURN-TO-SPORT EVALUATION RECOMMENDATIONS:**

- Hop tests (single-leg hop, triple hop, cross-over hop, 6 meter timed-hop)
- Isokinetic strength test (60°/second)
- Vertical jump
- Deceleration shuttle test

**RETURN-TO-SPORT CRITERIA:**

- No functional complaints
- Confidence when running, cutting, jumping at full speed
- 85% contralateral values on hop tests

*Please send progress notes.*

**Physician's Signature:** \_\_\_\_\_

(I have medically prescribed the above treatments)

**Michael S. Day, MD**