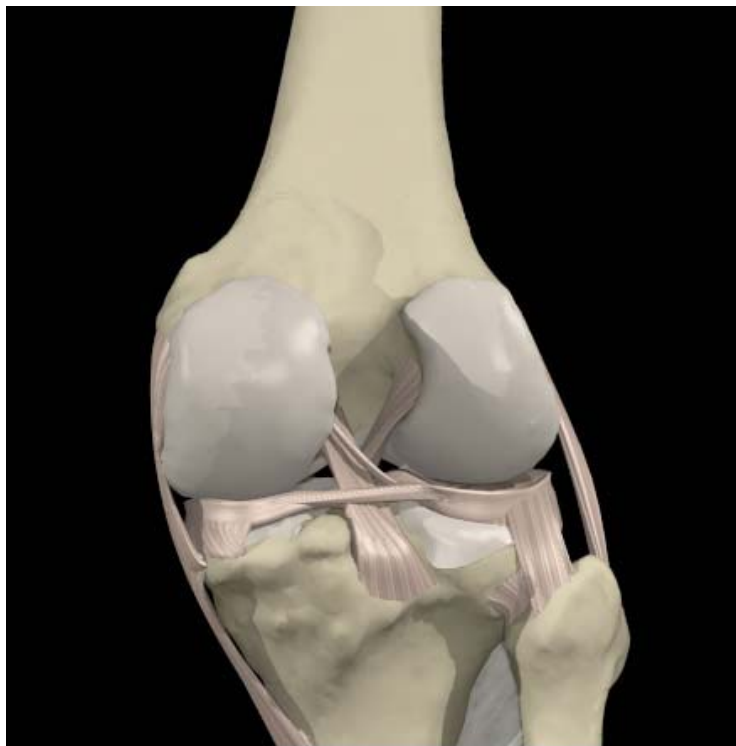


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**REHABILITATION PROTOCOL**

**KNEE**  
**ACL Reconstruction Protocol**



Interactive Knee 1.1 © 2000 Primal Pictures Ltd.

Please contact us with any questions. [www.pacosm.com](http://www.pacosm.com)

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Developed: 9/2008

Revised: \_\_\_\_\_

 <b>COSM REHAB</b>	<b>REHABILITATION PROTOCOL</b>	<b>PAGE 1 OF 7</b>
<b>ACL RECONSTRUCTION (PTG) PROTOCOL</b>	<b>Indiana 724.465.2676 Punxsutawney 814.938.0740 Clarion 814.226.6573</b>	<b>DEVELOPED: 5/2008 REVISED:</b>

**Special Note:** *This protocol is only a guideline and not intended to substitute for appropriate clinical decision making by the clinician. If a clinician requires assistance, the clinician should consult the referring surgeon.*

The intent of this protocol is to provide the clinician with a guideline of the postoperative rehabilitation course of a patient that has undergone an ACL reconstruction. It is not intended to be a substitute for appropriate clinical decision making regarding the progression of a patient's postoperative course. The actual postsurgical physical therapy management must be based on the surgical approach, physical exam/findings, individual progress, and/or presence of postoperative complications. If a clinician requires assistance in the progression of a patient post-surgery, the clinician should consult with the referring surgeon.

### **Phase I: Days 1-14**

- Goals:**
- Gain and maintain full knee extension
  - Reestablish quadriceps contraction
  - Control pain, swelling, and inflammation
  - Gradually increase active and passive ROM (0-90 degrees)
  - Patient is able to perform SLR without extensor lag
  - Normalize gait pattern with assistive device

### **PRECAUTIONS**

- **PATIENT IS ALLOWED OUT OF BRACE ONLY DURING EXERCISES AND PROM**
  - **MUST SLEEP IN BRACE LOCKED AT 0 DEGREES EXTENSION**
- 1) Patient is immobilized in post-op brace as ordered by physician (with ROM set as prescribed by physician)
  - 2) Exercises/Activities
    - a. **POST-OP DAY 1**
      - i. Transfer training
      - ii. Gait training with crutches
      - iii. Quad sets
      - iv. Ham sets
      - v. Glut sets
      - vi. Co-contractions (quads and hams)

Developed: 9/2008  
Revised: \_\_\_\_\_

- vii. Ankle ROM
- b. **POST-OP DAYS 2-5** (exercises out of brace)
  - i. Continue previous exercises
  - ii. Educate patient on patella mobilizations (inferior, superior and medial)
  - iii. Progress quad and ham sets to multi-angular isometrics
    - 1. 0 degrees extension
    - 2. 60 degrees flexion (sitting)
    - 3. 90 degrees flexion (sitting)
  - iv. Resisted ankle ROM with Theraband (4-way)
  - v. Hamstring stretch with sheet
  - vi. Heel slides with sheet in supine or long sitting
  - vii. Heel slides in sitting with foot on the floor
  - viii. Prone knee flexion
  - ix. Standing knee flexion
  - x. Prone hang (avoiding direct pressure to incisions)
  - xi. Prone hip extension with ankle plantarflexed
  - xii. Supine SLR with ankle dorsiflexed
  - xiii. Prone quad sets
- c. **POST-OP DAYS 5-14**
  - i. Continue previous exercises
  - ii. Seated calf stretch with towel
  - iii. Seated hamstring stretch
  - iv. Bilateral calf raises
- 3) Passive ROM as tolerated (0-90 degrees)
- 4) Ice, elevation and modalities as indicated for pain management, edema control, and quadriceps neuromuscular reeducation

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

- Goals:**
- Maintain full extension of the knee
  - Increase AROM 0-120 degrees
  - Normalize full weight-bearing gait
  - Able to perform half squat (to 45 degrees knee flexion)
  - Able to perform 6 inch forward step-up

## **PRECAUTIONS**

- **AVOID OPEN CHAIN KNEE EXTENSIONS TO DECREASE STRESS ON GRAFT**
  - **NO JOGGING, RUNNING, OR QUICK LATERAL MOVEMENTS**
- 1) Progress partial weight bearing with 2 axillary crutches to 1 crutch and eventually full weight-bearing with brace as tolerated
  - 2) Brace may be open to allow 0-120 degrees of knee flexion as tolerated, with good quadriceps control
  - 3) Exercises
    - a. Continue previous exercises with minimal resistance applied as tolerated
      - i. Add ankle weights for SLRs as tolerated
      - ii. Single leg stance eyes open
    - b. Continue patellar mobilizations
    - c. Mini squats: starting at 30 degrees flexion and progressing to 45 degrees

Developed: 9/2008

Revised: \_\_\_\_\_

- d. Forward lunges: up a step initially to limit motion, then progressing to ground level as muscle control improves
- e. Unilateral calf raises
- f. Theraband around thighs - side stepping and box stepping
- g. Stationary bike (once 110 degrees of knee flexion is reached)
- h. Seated hamstring curls with Theraband resistance
- i. Forward step-ups with forward lean of the trunk (2"-10")
- j. Resisted terminal knee extensions: in standing with Theraband above knee
- k. Single leg squats on leg press with minimal resistance (light)

### **Phase III: 4-10 Weeks**

#### **Goals:**

- Minimal residual effusion
- Full painfree ROM (6-9 weeks)
- Single leg stance, 10 seconds with eyes closed
- Squats to 45 degrees to at least 20% body weight by 7 weeks, at least 30% by 10 weeks post-surgery
- Single leg squat (with control) to 45 degrees knee flexion without balance assist by 7 weeks, and 10 single leg squats by 10 weeks
- Controlled lateral step-up, 6" x 10 repetitions

#### **PRECAUTIONS**

- **GRAFT IS MOST VULNERABLE AT 8 WEEKS POST-SURGERY**
  - **AVOID OR INCREASE WITH CAUTION ANY OPEN KINETIC CHAIN EXTENSIONS TO DECREASE SHEARING FORCES ON THE GRAFT**
  - **NO JOGGING/NO RUNNING**
- 1) Emphasis is placed on strength progression and proprioception
    - a. 4-6 weeks post-surgery
      - i. Continue Phase II exercises progressing resistance as tolerated
      - ii. Single leg squats to 45 degree maximum
      - iii. Forward step-up with forward lean of trunk
      - iv. Lateral step-ups 2-4"
      - v. Leg press (light)
      - vi. 4-way hip machine
    - b. 6-8 weeks post-surgery
      - i. Retro step-ups (step downs) at 6 weeks
      - ii. Lateral step-ups 6-8" (8"maximum)
      - iii. Fitter
      - iv. BAPS board/wobble board
      - v. Single leg stance on Bocu ball, balance disc or foam pad (at 6 weeks)
      - vi. Sport cord – Retro and lateral movements
    - c. 8-10 weeks post-surgery
      - i. Progress to forward step-up with heel raises (8" with trunk lean forward)
      - ii. Eccentric ham curls
  - 2) Progress endurance
    - a. Stationary bike
    - b. Treadmill power walking

Developed: 9/2008

Revised: \_\_\_\_\_

- c. Elliptical
- d. Stairmaster (at 6 weeks)
- e. Pool
  - i. Flutter kick
  - ii. Jogging
- 3) Begin development of dynamic strength
  - a. 6-8 weeks post-surgery
    - i. Sport cord – retro and lateral movements
  - b. 8-10 weeks post-surgery
    - i. Low level Total Gym single leg jumps
    - ii. Side lunges
- 4) Modalities as needed for pain management and inflammation control

### **Phase IV: 10-12 Weeks**

- Goals:**
- Able to perform 15 independent single leg squats
  - Control landings on jumps up to 12”
  - Able to squat 50% of body weight

### **PRECAUTIONS**

- o **NO RUNNING**
- 1) Continue Phase II and III activities – incorporate 8 activities in addition to the new ones listed below
- 2) Emphasize dynamic strength while incorporating multidirectional motions
  - a. Side shuffle
  - b. Karaoke
  - c. Sliding board
- 3) Preparation for return to running
  - a. Progress quick walk to slow jogging
  - b. Stationary jog against bungee cord resistance
  - c. Pool running
- 4) Control of jumping and soft landing
  - a. Jumps up to 6” progressing to 12”
  - b. Mini-jumps on mini-trampoline
  - c. Running in place on mini-trampoline
  - d. Forward step ups with jump (lean forward and land softly)

### **Phase V: 12-16 Weeks**

- Goals:**
- Able to control landings jumping down from 12”
  - Independent with half speed running forward and backward
  - Able to control rotational jumps and landings
  - Performs independent lateral hops
  - Able to control single leg landings up to 6” on a mat

### **PRECAUTIONS**

- o **LIMIT THE NUMBER OF IMPACT ACTIVITIES PER REHAB SESSION**
- o **NO COMPETITIVE OR PIVOT SPORTS UNTIL CLEARED BY SURGEON**

- 1) Perform 5 exercises from previous activities, and 5 from below, per rehab session
- 2) Emphasize return to sport forces and activities.
  - a. Jump rope
  - b. Twisting jumps on mini-tramp
  - c. Backward running
  - d. Jumps up to mats with quarter turn
  - e. Medicine ball wall tossing, catch and throw activities
  - f. Controlled jumps down from 6” progressing to 12”
  - g. Lateral hops
  - h. Slow jog progressing to straight forward running
  - i. Single leg clock drill
- 3) Optional fitting for a functional ACL brace

### **Phase VI: 16-24 Weeks**

- Goals:**
- Return to sports practice for upper body skills
  - Full speed running, cutting and stopping
  - Patient has at least 80% Quad/Hamstring strength with isokinetic testing
  - Single leg long jump is at least 90% of uninjured side
  - Functional testing in clinic to determine return to sports skills on own at practice
  - Quad/thigh circumference should be within 1 cm of non-operative side

### **PRECAUTIONS**

- **NO COMPETITIVE OR PIVOT SPORTS UNTIL CLEARED BY SURGEON**
- 1) Controlled return to sports and sport specific skills on their own
    - a. Basketball – shooting baskets only
    - b. Rollerblades – level surfaces, NO hills, quick stops, cutting, or cross-overs
    - c. Recreational tennis – NO sharp pivoting
    - d. Golf – 9 holes (avoid fatigue)
  - 2) Activities – Continue with 5 exercises from previous phases and 5 from below.
    - a. 16 to 20 weeks post-surgery
      - i. Lateral shuffles with reactions
      - ii. Single leg jumping
      - iii. Resisted running
      - iv. Figure 8 running gradually decreasing in diameter
      - v. Cutting drills with quick stopping and maintained balance
      - vi. Lower extremity circuit training
        - Squats
        - Lunges
        - Side lunges
        - Single leg squats
        - Calf raises
    - b. 20 to 24 weeks post-surgery
      - i. Plyometrics (progressing hops from 2 legs to single leg)
        - Diagonal lunges

- Running against bungee cord resistance incorporating UE or LE activity, i.e., catching, passing, kicking, jumping
- 2 leg forward/backward/side hops
- 4 square hops
- 2 square diagonal hops
- Ski hops (side to side)
- Box hops 2''-4''-6''
  - Side to side
  - Front to back
- ii. Sport specific activities
- iii. Lateral shuffles with reactions
- iv. Zig-zag running
- v. Backward running with cutting
- vi. Stop and go drills
- vii. Isokinetic testing at 16 weeks 180°/sec and 300°/sec
- viii. Isokinetic testing at 24 weeks; goal is 90% quad/hamstring strength of the uninvolved side
- ix. Functional testing in clinic:
  - Lunge walk with control both forward and backward
  - Forward hop and lateral hop with control and comparable distances between L and R side
  - One foot hopping with control
  - Triple jump and landing with control and comparable distances between L and R side
  - Sport specific demands with adequate skill, speed, and control

### **Return to Sports: 24+ Weeks**

#### **\*\*NO COMPETITIVE OR PIVOT SPORTS UNTIL CLEARED BY SURGEON\*\***

- After the patient has passed the functional testing in clinic, he/she may return to athletic performance. They may return to a sports performance program, their team's off season strength and conditioning program, or after a structured, well outlined plan for return, they may directly return to their sport if in-season.
- Patient will continue the maintenance program set up by his/her physical therapist for strengthening/flexibility.
- It is recommended for the patient to continue donning the functional ACL brace for 12 months following surgery. After their first anniversary, it will be up to the patient as to whether they want to continue wearing the brace and for which activities.
- The patient will return to the physician for their one year post-operative follow-up appointment.

Developed: 9/2008

Revised: \_\_\_\_\_

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Developed: 9/2008

Revised: \_\_\_\_\_