

## Accelerated Rehabilitation Following ACL-PTG Reconstruction & PCL Reconstruction with Medial Collateral Ligament Repair

### PREOPERATIVE PHASE

**Goals:** Diminish inflammation, swelling, and pain  
Restore normal range of motion (especially knee extension)  
Restore voluntary muscle activation  
Provide patient education to prepare patient for surgery

**Brace** – Elastic wrap or knee sleeve to reduce swelling

**Weight Bearing** – As tolerated with or without crutches

**Exercises:**

- \*Ankle Pumps
- \*Passive knee extension to zero
- \*Passive knee flexion to tolerance
- \*Straight Leg Raises (3 Way, Flexion, Abduction, Adduction)
- \*Quadriceps Setting
- \*Closed kinetic chain exercises: mini squats, lunges, step-ups

**Muscle Stimulation** – Electrical muscle stimulation to quadriceps during voluntary quadriceps exercises (4 to 6 hours per day)

#### **Neuromuscular/Proprioception Training -**

- Eliminate quad avoidance gait
- Retro stepping drills

**Cryotherapy/Elevation** – Apply ice 20 minutes of every hour, elevate leg with knee in full extension (knee must be above heart)

**Patient Education** – Review postoperative rehabilitation program  
Review instructional video (optional)  
Select appropriate surgical date

### POST-OPERATIVE PRECAUTIONS:

- Be sure to obtain full passive knee extension
- Gradually restore knee flexion
- No squatting behind 60-75° for 8-10 weeks
- No Hamstring strengthening for 8-10 weeks
- No resisted knee extensions from 90 or 100° for 12-14 weeks
- No deep squatting to 90 degrees for 14-16 weeks
- No running or jumping until cleared by Physician

### IMMEDIATE POST-OPERATIVE PHASE (Day 1 to Day 7)

**Goals:** Restore full passive knee extension  
Diminish joint swelling and pain  
Restore patellar mobility  
Gradually improve knee flexion  
Re-establish quadriceps control  
Restore independent ambulation

### **Postoperative Day 1**

**Brace** – Brace/Immobilizer applied to knee, locked in full extension during ambulation

**Weight Bearing** – Two crutches, weight bearing as tolerated

**Range of Motion** – Zero degrees to 45 deg flexion

**Exercises:**

- \*Ankle pumps
- \*Overpressure into full, passive knee extension
- \*Active and Passive knee flexion (90 degree by day 5)
- \*Straight leg raises (Flexion, Abduction, Adduction)
- \*Quadriceps isometric setting
- \*Hamstring stretches
- \*Closed kinetic chain exercises: mini squats, weight shifts

**Muscle Stimulation** – Use muscle stimulation during active muscle exercises (4-6 hours per day)

**Continuous Passive Motion** – As needed, 0 to 45 degrees (as tolerated and as directed by physician)

**Ice and Evaluation** – Ice 20 minutes out of every our and elevate with knee in full extension

### **Postoperative Day 2 to 3**

**Brace** – Brace/Immobilizer, locked at zero degrees extension for ambulation and unlocked for sitting,etc.

**Weight Bearing** – Two crutches, weight bearing as tolerated

Range of Motion – Remove brace perform range of motion exercises 6-8 times per day  
Perform frequent bouts of ROM to regain knee flexibility  
PROM: Zero degrees to 45 deg flexion

**Exercises:**

- \*Multi-angle isometrics at 90 and 60 degrees (knee extension)
- \*Knee Extension 90-40 degrees
- \*Overpressure into extension (knee extension should be at least 0 degrees to slight hyperextension)
- \* Emphasize restoring knee extension
- \*Patellar mobilization
- \*Ankle pumps
- \*Straight leg raises (3 directions)
- \*Mini squats and weight shifts
- \*Quadriceps isometric setting

**Muscle Stimulation** – Electrical muscle stimulation to quads (6 hours per day)

**Continuous Passive Motion** – 0 to 60 degrees, as needed

**Ice and Evaluation** – Ice 20 minutes out of every hour and elevate leg with knee in full extension

**Postoperative Day 4 to 7**

**Brace** – Brace/Immobilizer, locked at zero degrees extension for ambulation and unlocked for sitting, etc.

**Weight Bearing** – Two Crutches weight bearing as tolerated

**Range of Motion** – Remove brace to perform range of motion exercises 6-8 times per day, knee flexion 80 degrees by day 7

**Exercises:**

- \*Multi-angle isometrics at 75 and 60 degrees (knee extension)
- \*Knee Extension 90-40 degrees
- \*Overpressure into extension (full extension 0 degrees to 5-7 hyperextension)
- \*Patellar mobilization (5-8 times daily)
- \*Ankle pumps
- \*Straight leg raises (3 directions)
- \*Mini squats and weight shifts
- \*Quadriceps isometric setting
- \*Proprioception and balance activities

**Neuromuscular training/proprioception** – OKC passive/active joint repositioning at 90, 60 degrees

**CKC** squats/weight shifts with repositioning on sports RAC

**Muscle Stimulation** – Electrical muscle stimulation (continue 6 hours daily)

**Continue Passive Motion** – 0 to 90 degrees, as needed

**Ice and Elevation** – Ice 20 minutes of every hour and elevate leg with knee full extension

**II. EARLY REHABILITATION PHASE (Week 2-4)****Criteria to Progress to Phase II**

- 1) Quad Control (ability to perform good quad set and SLR)
- 2) Full passive knee extension
- 3) PROM 0-90 degrees
- 4) Good patellar mobility
- 5) Minimal joint effusion
- 6) Independent ambulation

**Goals:** Maintain full passive knee extension (at least 0 to 5-7 hyperextension)  
Gradually increase knee flexion  
Diminish swelling and pain  
Muscle control and activation  
Restore proprioception/neuromuscular control  
Normalize patellar mobility

**Week Two**

**Brace** – Continue locked brace for ambulation

**Weight Bearing** – As tolerated (goal is to discontinue crutches 10-14 days post-op)

**Passive Range of Motion** – Self-ROM stretching (6-8 times daily), emphasis on zero to 100 degrees (minimal)

**Exercises:**

- \*Muscle stimulation to quadriceps exercises
- \*Isometric quadriceps sets
- \*Straight Leg raises (4 planes)
- \*Leg Press (0-60 degrees)
- \*Knee extension 90-40 degrees
- \*Half squats (0-40)
- \*Weight shifts
- \*Front and side lunges
- \*Uni-cam bicycle (low intensity cycling)
- \*Proprioception training
- \*Overpressure into extension
- \*Passive range of motion from 0 to 105 degrees
- \*Patellar mobilization
- \*Well leg exercises
- \*Progressive resistance extension program – start with 1 lb., progress 1 lb. per week

#### **Proprioception/Neuromuscular Training**

- \*OKC passive/active joint repositioning 90, 60, 30 degrees
- \*CKC joint repositioning during squats/lunges
- \*Initiate squats on tilt board use sports RAC with repositioning

**Swelling control** – Ice, compression, elevation

#### **Week Three**

**Brace** – Discontinue locked brace (some patients use ROM brace for ambulation)

**Passive Range of Motion** – Continue range of motion stretching and overpressure into extension (ROM should be 0-100/105 degrees)

**Exercises:**

- \*Continue all exercises as in week two
- \*Passive Range of Motion 0-105 degrees
- \*Bicycle for range of motion stimulus and endurance (emphasize ROM on bike)
- \*Pool walking program (if incision is closed)
- \*Eccentric quadriceps program 40-100 (isotonic only)
- \*Lateral lunges (straight plane)
- \*Front Step Downs
- \*Lateral Step-Overs (cones)
- \*Hip ER/IR strengthening (clams, tubing)
- \*Progress Proprioception drills, neuromuscular control drills
- \*Frequent bouts of ROM exercises

### **III. PROGRESSIVE STRENGTHENING/NEUROMUSCULAR CONTROL PHASE (Week 4-10)**

#### **Criteria to Enter Phase III**

- 1) Active Range of Motion 0-115 degrees
- 2) Quadriceps strength 60 % > contralateral side (isometric test at 60 degree knee flexion)
- 3) Unchanged KT Test bilateral values (+1 or less)
- 4) Minimal to no full joint effusion
- 5) No joint line or patellofemoral pain

**Goals:** Restore full knee range of motion (0 to 125 degrees)  
Improve lower extremity strength  
Enhance proprioception, balance, and neuromuscular control  
Improve muscular endurance  
Restore limb confidence and function

**Brace** – End of week 4 may discontinue unlocked brace (Physician decision)  
continue ambulation with unlocked brace or knee sleeve

**Range of Motion** – Self-ROM (4-5 times daily using the other leg to provide ROM), emphasis on maintaining zero degrees passive extension  
- PROM 0-125 degrees at 4 weeks

**KT 2000 Test** – (Week 4, 20 lb. anterior and posterior test)

#### Week 4

**Exercises:**

- \*Progress isometric strengthening program
- \*Leg Press (0-90 degrees)
- \*Knee extension 90 to 40 degrees
- \*No Hamstring strengthening for 8 weeks
- \*Hip Abduction and Adduction
- \*Hip Flexion and Extension
- \*Lateral Step-Overs
- \*Lateral Lunges (straight plane and multi-plane drills)
- \*Lateral Step Ups
- \*Front Step Downs
- \*Wall Squats
- \*Vertical Squats
- \*Standing Toe Calf Raises
- \*Seated Toe Calf Raises
- \*Biodex Stability System (Balance, Squats, etc)
- \*Proprioception Drills
- \*Bicycle
- \*Stair Stepper Machine
- \*Pool Program (Backward Running, Hip and Leg Exercises)

#### **Proprioception/Neuromuscular Drills**

- Tilt board squats (perturbation)
- Passive/active reposition OKC
- CKC repositioning on tilt board with sports RAC
- CKC lunges with sports RAC

#### Week 6

**KT 2000 Test** – 20 and 30 lb. anterior and posterior test

**Exercises:**

- \*Continue all exercises
- \*Pool running (forward) and agility drills
- \*Balance on tilt boards
- \*Progress to balance and ball throws
- \*Wall slides/squats

### Week 8

**KT 2000 Test** – 20 and 30 lb. anterior and posterior test

**Exercises:**

- \*Continue all exercises listed in Weeks 4-6
- \*Leg Press Sets (single leg) 0-90 degrees and 40-90 degrees
- \*Hip strengthening drills
- \*Perturbation Training
- \*Pool program
- \*Walking Program
- \*Bicycle for endurance
- \*Stair Stepper Machine for endurance
- \*Biodex stability system

### Week 10

**KT 2000 Test** – 20 and 30 lb. and Manual Maximum Test

**Isokinetic Test** – Concentric Knee Extension/Flexion at 180 and 300 degrees/second

**Exercises:**

- \*Continue all exercises listed in Weeks 6, 8 and 10
- \*Hamstring curls (light)
- \*Continue Stretching Drills
- \*Progress strengthening exercises and neuromuscular training

## IV. ADVANCED ACTIVITY PHASE (Week 10-16)

### **Criteria to Enter Phase IV**

- 1) AROM 0-125 degrees or greater
- 2) Quad strength 75% of contralateral side, knee extension flexor:extensor ratio 70% to 75%
- 3) No change in KT values (Comparable with contralateral side, within 2 mm)
- 4) No pain or effusion
- 5) Satisfactory clinical exam
- 6) Satisfactory isokinetic test (values at 180 degrees)
  - Quadriceps bilateral comparison 75%
  - Hamstrings equal bilateral
  - Quadriceps peak torque/body weight 65% at 180°/s (males) 55% at 180°/s (females)
  - Hamstrings/quadriceps ratio 66% to 75%
- 7) Subjective knee scoring (modified Noyes System) 80 points or better

**Goals:** Normalize lower extremity strength  
Enhance muscular power and endurance  
Improve neuromuscular control  
Perform selected sport-specific drills

**Exercises:**

- \*May initiate running program (weeks 12-14)\*\*
  - \*\* **When criteria has been met & Medical Team clears athlete to Initiate running program**
- \*May initiate light sport program (golf)
- \*Continue all strengthening drills
  - Leg press
  - Wall squats

- Hip Abd/Adduction
- Hip Flex/Ext
- Knee Extension 90-40
- Hamstring curls
- Hip ER strengthening
- Hip extension strengthening
- Standing toe calf
- Seated toe calf
- Step down
- Lateral step ups
- Lateral lunges
- \*Neuromuscular training
  - Lateral step-overs cones
  - Lateral lunges
  - Tilt board drills

**Week 14-16**

- \*Progress program
- \*Continue all drills above
- \*May initiate lateral agility drills

**V. RETURN TO ACTIVITY PHASE (Month 16-22)**

**Criteria to Enter Phase V**

- 1) Full Range of Motion
- 2) Unchanged KT 2000 Test (within 2.5 mm of opposite side)
- 3) Isokinetic Test that fulfills criteria
- 4) Quadriceps bilateral comparison (80% or greater)
- 5) Hamstring bilateral comparison (110% or greater)
- 6) Quadriceps torque/body weight ratio (55% or greater)
- 7) Hamstrings/Quadriceps ratio (70% or greater)
- 8) Proprioceptive Test (100% of contralateral leg)
- 9) Functional Test (85% or greater of contralateral side)
- 10) Satisfactory clinical exam
- 11) Subjective knee scoring (modified Noyes System) (90 points or better)

**Goals:** Gradual return to full-unrestricted sports (when cleared by medical team)  
 Achieve maximal strength and endurance  
 Normalize neuromuscular control  
 Progress skill training

**Tests** – KT 2000, Isokinetic, and Functional Tests before return

- Exercises**
- \*Continue strengthening exercises
  - \*Continue neuromuscular control drills
  - \*Continue plyometrics drills
  - \*Progress running and agility program
  - \*Progress sport specific training
    - Running/cutting/agility drills
    - Gradual return to sport drills

**6 MONTH FOLLOW-UP**

Isokinetic test  
 KT 2000 test  
 Functional test

**12 MONTH FOLLOW-UP**

Isokinetic test  
 KT 2000 test  
 Functional test