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## Accelerated Rehabilitation Following ACL-PTG Reconstruction with PCL Repair with LCL and Posterolateral Corner Repair

### PREOPERATIVE PHASE

**Goals:** Diminish inflammation, swelling, and pain  
Restore normal range of motion (gradual 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 (gradual progression)  
\*Passive knee flexion to tolerance  
\*Straight Leg Raises (3 Way, Flexion, Abduction), Pillow Squeezes  
\*Quadriceps Setting  
\*Closed kinetic chain exercises: mini squats, , 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
- Joint repositioning drills
  - Passive/active reposition at 90, 60, 30 degrees
  - CKC squat/lunge repositioning on screen

**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

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

**Goals:** Gradual 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** – Drop locked brace at 15-20 deg for comfort

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

- Exercises:**
- \*Ankle pumps
  - \*Overpressure into passive knee extension
  - \*Active and Passive knee flexion (75 degree by day 5)
  - \*Straight leg raises (Flexion, Abduction), Pillow Squeezes
  - \*Quadriceps isometric setting
  - \*No Hamstring stretches

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

**Continuous Passive Motion** – As needed, 0 to 45/50 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** – Locked brace at 15-20 deg – come out of brace and perform ROM exercises

**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

- Exercises:**
- \* Continue exercises listed above
  - \* Emphasize restoring knee extension
  - \*Patellar mobilization
  - \*Ankle pumps
  - \*Straight leg raises, Pillow Squeezes
  - \*Mini squats and weight shifts
  - \*Quadriceps isometric setting

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

**Continuous Passive Motion** – 0 to 90 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** – Progress brace to Drop locked brace, 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 90 degrees by day 5, approximately 100 degrees by day 7

- Exercises:**
- \*Multi-angle isometrics at 60 & 40 deg extension
  - \*Active knee extension 60 to 30 deg
  - \*Light Overpressure into extension
  - \*Patellar mobilization (5-8 times daily)
  - \*Ankle pumps
  - \*Straight leg raises, Pillow Squeezes
  - \*Mini squats and weight shifts
  - \*No hamstring contractions for 8-10 weeks

- \*Quadriceps isometric setting
- \*Proprioception and balance activities

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

**CKC mini-** squats & weight shifts

**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:** Gradual increase to full passive knee extension

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 14 days post-op)

**Passive Range of Motion** – Self-ROM stretching (6-8 times daily), emphasis on maintaining full, passive range of motion

**Exercises:** \*Muscle stimulation to quadriceps exercises

\*Isometric quadriceps sets

\*Straight Leg raises (4 planes)

\*Leg Press (0-60 degrees)

\*Knee extension 75 to 30 degrees

\*Half squats (0-40)

\*Weight shifts

\*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

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

**Week Three**

**Brace** – Drop 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 0-100 degrees
  - \*Bicycle for range of motion stimulus and endurance (emphasize ROM on bike)
  - \*Eccentric quadriceps program 40-100 (isotonic only)
  - \*Front Step Downs
  - \*Lateral Step-Overs (cones)
  - \*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** – Discontinue immobilizer or brace when Physician determines, may use knee sleeve to control swelling/support

**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

**Week 4**

- Exercises:**
- \*Progress isometric strengthening program
  - \*Leg Press (0-75 degrees)
  - \*Knee extension 90 to 40 degrees
  - \*Hip Abduction and Adduction
  - \*Hip Flexion and Extension
  - \*Lateral Step-Overs
  - \*Lateral Lunges (straight plane)
  - \*Lateral Step Ups
  - \*Front Step Downs
  - \*Wall Squats

- \*Vertical Squats
- \*Standing Toe Calf Raises
- \*Seated Toe Calf Raises
- \*Proprioception Drills
- \*Bicycle

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

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

#### **Week 6**

- Exercises:** \*Continue all exercises
- \*Pool walking
  - \*Balance on tilt boards
  - \*Progress to balance and ball throws
  - \*Wall slides/squats

#### **Week 8:**

- Exercises:** \*Continue all exercises listed in Weeks 4-6
- \*Leg Press Sets (single leg) 0-100 degrees and 40-100 degrees
  - \*Still no hamstrings
  - \*Perturbation Training
  - \*Emphasize quads
  - \*Walking Program
  - \*Bicycle for endurance
  - \*Stair Stepper Machine for endurance
  - \*Biodex stability system

#### **Week 10**

- Exercises:** \*Continue all exercises listed in Weeks 6, 8 and 10
- \*Progress hip strengthening (especially hip abd, ext, ER)
  - \*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. Hop Test (80% of contralateral leg)
8. Subjective knee scoring (modified Noyes System) 80 points or better

**Goals:** Normalize lower extremity strength  
Enhance muscular power and endurance  
Improve neuromuscular control

**Exercises:** \*May initiate pool running program (weeks 10-12) if good quad control and ROM

\*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 (maybe ??)
- 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

\*Progress LE strengthening & stabilization drills

## V. GRADUAL RETURN TO ACTIVITY PHASE (Week 17-26)

### 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

Achieve maximal strength and endurance

Normalize neuromuscular control

Progress skill training

**Exercises** \*Continue strengthening exercises

\*Continue neuromuscular control drills

\*Continue plyometrics drills (gravity eliminated)

\*Progress running and progress to 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