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## Accelerated Rehabilitation Following Contralateral PTG ACL Reconstruction with LCL Primary Repair

### PREOPERATIVE PHASE

**Goals:** Diminish inflammation, swelling, and pain  
Restore normal range of motion (especially knee extension – may not be full extension because of LCL)  
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 (0-45)

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

**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

**Donor Knee**

- \*Strengthen what will be the donor knee (especially the quadriceps)
- \*Improve Quadriceps recruitment in preparation for postoperative rehabilitation
- \*Educate patient on the concept of 2 separate surgeries and 2 different rehabilitation programs
- \*Bike (20 min)
- \*PREs for both lower extremities

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

**Goals:** Restore full passive knee extension  
Diminish joint swelling and pain  
Protect LCL & PL capsule – Promote LCL healing  
Restore patellar mobility  
Gradually improve knee flexion  
Re-establish quadriceps control  
Restore independent ambulation

#### Postoperative Day 1

**Brace** – Knee brace applied to knee, locked at 30 degrees of flexion

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

- Exercises**
- \*Ankle pumps
  - \*Passive knee extension to 30 degrees of flexion
  - \*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 45/50 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

- Donor Knee**
- \*Full knee ROM
  - \*Especially full extension
  - \*Independent straight-leg raise
  - \*Weight bearing as tolerated
  - \*ROM
  - \*Ice to PTG placed on the patient's knee immediately after surgery to provide compression and cold to minimize pain and swelling.
  - \*Over pressure into extension
  - \*Knee flexion
    - Continue to increase bend beyond 110 degrees flexion
  - \*Leg control
    - Active quadriceps contraction with quad sets
    - Straight-leg raises
    - Knee extension 90-0 with lock out at terminal extension

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

**Brace** – Knee brace locked at 30 degrees of knee flexion

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

**Range of Motion** – Remove brace perform range of motion exercises 4 to 6 times a day

- Exercises**
- \*Multi-angle isometrics at 90 and 60 degrees (knee extension)
  - \*Knee Extension 90-40 degrees
  - \*Patellar mobilization
  - \*Passive knee extension to 30 degrees (based on end feel)
  - \*Ankle pumps
  - \*Straight leg raises (3 directions)
  - \*Mini squats and weight shifts
  - \*Quadriceps isometric setting

**Exercises for Donor Knee:** Continue all quadriceps & LE exercises

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

**Continuous Passive Motion** – 30 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** – Knee brace locked at 30 degrees for first 4-5 days then gradually increase extension

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

**Range of Motion** – Remove brace to perform range of motion exercises 4-6 times per day, knee flexion 90 degrees by day 5, approximately 100 degrees by day 7

**Exercises**

- \*Multi-angle isometrics at 90 and 60 degrees (knee extension)
- \*Knee Extension 90-40 degrees
- \*Passive knee extension – progress to 20 degrees of knee flexion
- \*Patellar mobilization
- \*Ankle pumps
- \*Straight leg raises (3 directions)
- \*Mini squats and weight shifts
- \*No hamstrings for 2-3 weeks
- \*Quadriceps isometric setting
- \*Proprioception and balance activities

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

**Continue Passive Motion** – 20 to 90 degrees, as needed

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

**Donor Knee**

- \*ROM exercises
- \*Heel slides if needed
- \*Step downs (1-4"): 2 x 20
- \*Leg extensions with cuff weight (0-10 lb.): 3 x 12-15
- \*Heel lifts: 3 x 12
- \*Ice
- Patellar mobilization
- Soft tissue mobilization
- \*Electrical stimulation of quads

**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  
 Gradually increase knee flexion  
 Diminish swelling and pain  
 Muscle training  
 Restore proprioception  
 Patellar mobility

## Week Two

**Brace** – Knee brace is locked at full extension for ambulation

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

**Range of Motion** – Gradually increase passive knee extension

Base the progression of knee extension on end feel\* (if tight push it more)

Day 8: 10- 100>

Week 14: 0 - 115>

Week 4: 0- 125>

Self-ROM stretching (4-5 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
- \*Knee extension 90-40 degrees
- \*Half squats (0-40)
- \*Weight shifts
- \*Front and side lunges
- \*Hamstring Curls (light resistance at 4 weeks)
- \*Bicycle
- \*Proprioception training
- \*Overpressure into extension
- \*Passive range of motion from 0 to 50 degrees
- \*Patellar mobilization
- \*Well leg exercises
- \*Progressive resistance extension program – start with 1 lb., progress 1 lb. per week

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

**Donor Knee**

- \*Active heel height with good quadriceps tone indicated by no extensor lag when performing a straight-leg raise
- \*ROM
- \*Bike
- \*Quadriceps stretching (4 x 30 sec)
- \*Weights (unilateral)
  - Leg press: 4 x 12-15
  - Leg extension: 3 x 12
  - Leg curls: 3 x 12
  - Heel lifts: 4 x 15
- \*Continue quad strengthening exercises

## Week Three

**Brace** – Continue use of knee brace (if able open ROM limits to allow motion during walking)

**Range of Motion** – Continue range of motion stretching and overpressure into extension

**Exercises**

- \*Continue all exercises as in week two
- \*Passive Range of Motion 0-115> degrees

- \*Bicycle for range of motion stimulus and endurance
- \*Pool walking program (if incision is closed)
- \*Eccentric quadriceps program 40-100 (isotonic only)
- \*Lateral lunges
- \*Lateral Step Ups
- \*Front Step Ups
- \*Fwd/Bwd cone stepping
- \*Lateral Step-Overs (cones)
- \*Hip ER/IR strengthening
- \*Sidelying clams
- \*Progress Proprioception drills, neuromuscular control drills

### III. CONTROLLED AMBULATION 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** – Knee brace continues with motion (consider unloader brace if physician prefers)

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

#### Week 4

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| <b>Exercises</b> | <ul style="list-style-type: none"> <li>*Progress isometric strengthening program</li> <li>*Leg Press</li> <li>*Knee extension 90 to 40 degrees</li> <li>*Hamstring Curls</li> <li>*Hip Abduction and Adduction</li> <li>*Hip Flexion and Extension</li> <li>*Lateral Step-Overs</li> <li>*Lateral Lunges</li> <li>*Lateral Step Ups</li> <li>*Front Step Downs</li> <li>*Wall Squats</li> <li>*Vertical Squats</li> <li>*Toe Calf Raises</li> <li>*Balance Board Squats</li> <li>*Proprioception Drills</li> <li>*Bicycle</li> <li>*Stair Stepper Machine</li> <li>*Pool Program (Backward Running, Hip and Leg Exercises)</li> </ul> |
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- Donor Knee**
- \*Full ROM
  - \*Quadriceps tone continues to improve with noticeable quadriceps definition returning
  - \*Return to full activity and 70% strength
  - \*Proprioceptive/agility specific program, including having the patient Catching ball when thrown
  - \*Progress hip strengthening exercises (hip ER/IR)
  - \*Same as ACL-reconstructed leg
  - \*Decrease repetitions, increase weight
    - Leg press:
    - Leg extension:
    - Leg curl:
    - Calf raises:

**Week 6**

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

- Exercises**
- \*Continue all exercises
  - \*Emphasize hip, quadriceps, hamstring strengthening
  - \*Pool running (forward) and agility drills
  - \*Balance on tilt boards
  - \*Progress to balance and board throws

**Week 8**

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

- Exercises**
- \*Continue all exercises listed in Weeks 4-6
  - \*Plyometric Leg Press
  - \*Perturbation Training
  - \*PRE strengthening
  - \*Walking for exercise
  - \*Bicycle for endurance
  - \*Elliptical machine
  - \*Stair Stepper Machine for endurance

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

**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 above
  - \*Advance all exercises listed
  - \*Unloading running in treadmill or pool initiated week 12 (Physician decision)
  - \*Emphasize functional drills, proprioception drills & perturbation drills

**Criteria to Enter Phase IV**

- 1) AROM 0-125 degrees or greater

- 2) Quad strength 79% 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
  - 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  
 Perform selected sport-specific drills

**Exercises** \*Continue all exercises

**V. RETURN TO ACTIVITY PHASE (Week 16-26)**

**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 (65% or greater)
- 7) Hamstrings/Quadriceps ratio (70% or greater)
- 8) Proprioceptive Test (90% 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)
- 12) Ability to run 2 miles

**Goals:** Gradual return to full-unrestricted sports  
 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

**6 MONTH FOLLOW-UP**

Isokinetic test  
 KT 2000 test  
 Functional test

**12 MONTH FOLLOW-UP**

Isokinetic test  
 KT 2000 test  
 Functional test