Rehabilitation Following ACL Reconstruction
With Medial Collateral Ligament Repair

I. 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)

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

A. 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

1) **Postoperative Day 1**

**Brace:**
• Brace/immobilizer applied to knee, locked in full extension

**Weight Bearing:** Two crutches, weight bearing as determined by physician

**Exercises:**
• Ankle pumps
• Overpressure into full, passive knee extension
• Active and Passive knee flexion (90 degree by day 14)
• Straight leg raises (Flexion, Abduction, Adduction)
• Quadriceps isometric setting
• Hamstring stretches

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

**Ice and Elevation:**
• Ice 20 minutes out of every hour and elevate with knee in full extension

B. **Postoperative Day 2 to 3:**

**Brace:**
• Brace/immobilizer locked at zero degrees extension for ambulation

**Weight Bearing:**
• Two crutches, toe-touch weight bearing

**Range of Motion:**
• Remove brace perform range of motion exercises 6-8 times a day
• Perform frequent bouts of ROM to regain flexibility

**Exercises:**
• 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 (No Adduction)
• Quadriceps isometric setting

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

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

### C. Postoperative Day 4 to 7:

**Brace:**
- Brace /immobilizer locked at zero degrees extension for ambulation

**Weight Bearing:**
- Two crutches, toe-touch weight bearing

**Range of Motion:**
- Remove brace to perform range of motion exercises 6-8 times per day, knee flexion 90 degrees by day 14, approximately 100 degrees by day 21

**Exercises:**
- Overpressure into extension (full extension 0)
- Patellar mobilization (5-8 times daily)
- Ankle pumps
- Straight leg raises (3 directions)
- Quadriceps isometric setting

**Muscle Stimulation:**
- Electrical muscle stimulation (6 hours daily)

**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

A. Week 2:

Brace:
- Continue locked brace for ambulation

Weight Bearing:
- As tolerated (goal is to discontinue crutches 14-28 days post op per physician request)

Exercises:
- Muscle stimulation to quadriceps exercises
- Isometric quadriceps sets
- Straight leg raises (No adduction)
- Mini squats
- Weight shifts
- Hamstring curls standing (active ROM)
- 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

Swelling Control:
- Ice, compression, elevation

B. Week 3:

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 (emphasize ROM on bike)
• Lateral step-overs (cones)
• Frequent bouts of ROM exercises

III. Progressive Strengthening / Neuromuscular Control Phase (Week 4-10)

Criteria to Progress to Phase III:
1) Active range of motion 0-115 degrees
2) Quadriceps strength 60% > contralateral side (isometric test at 60 degree knee flexion)
3) Minimal to no full joint effusion
4) No joint line or patellofemoral pain

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

Brace:
• Unlock for ambulation

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

A. Week 4:

Exercises:
• Progress isometric strengthening program
• Leg press (0-100 degrees)
• Knee extension 90-40 degrees
• Hamstring curls (isotonics)
• Hip abduction and adduction
• Hip flexion and extension
• Lateral step overs
• Lateral step ups
• Front step downs
• Wall squats
• Vertical squats
• Standing toe calf raises
• Biodex stability system (Balance, squats, etc.)
• Proprioception drills
• Bicycle
• Stair Stepper machine
• Pool program (Backward running, hip and leg exercises)

B. **Week 6:**

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

C. **Week 8:**

**Exercises:**
- Continue all exercises listed in Weeks 4-6
- Leg press sets (single leg) 0-100 degrees and 40-100 degrees
- Plyometric leg press
- Perturbation training
- Walking program
- Bicycle for endurance
- Stair stepper machine for endurance
- Biodex stability system

D. **Week 10:**

Isokinetic Test: Concentric knee extension/flexion at 180 and 300 degrees/second

**Exercises:**
- Continue all exercises listed in Weeks 6, 8, and 10
- Plyometric training drills

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• Continue stretching drills
• Progress strengthening exercises and neuromuscular training

IV. **Advanced Activity Phase (Week 10-16)**

**Criteria to Progress to 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%

**Goals:**

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

**Exercises:**

• 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
  - Standing toe calf
  - Seated toe calf
  - Step down
  - Lateral step ups
  - Lateral lunges
• Neuromuscular training
  - Lateral step-overs (cones)
  - Lateral lunges
  - Tilt board drills

A. **Week 14-16:**
• Progress program
• Continue all drills above
• May initiate lateral agility drills
• Backward running

V. Return to Activity Phase (Month 16-22)

Criteria to Progress to Phase V:
1) Full range of motion
2) Unchanged KT 2000 Test (with 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) Functional test (85% or greater or contralateral side)
9) Satisfactory clinical exam

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
  o Running/cutting/agility drills
  o Gradual return to sport drills