ORTHOPEDIC & SPORTS MEDICINE CENTER

The Strength of Experience

Accelerated Rehabilitation Following ACL-PTG Reconstruction with Meniscus 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
- Provide education to control forces across meniscus repair

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
- Joint repositioning on Sports RAC
- Passive/active reposition at 90°, 60°, 30°
- 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

Immediate Postoperative Phase (Day 1 to Day 7)

Precautions

- No squatting past 70° for 8 weeks
- No active resisted hamstrings for 8 weeks
- No active knee flexion beyond 90° flexion for 8 weeks
- No twisting for 4 months

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

- Locked in full extension during ambulation of Protonics

Weightbearing

- Two crutches, weightbearing as tolerated

Exercises

- Ankle pumps
- Overpressure into full, passive knee extension
- Active and passive knee flexion (90° by day 5)
- Straight leg raises (flexion, abduction, adduction)
- Quadriceps isometric setting
- Hamstring stretches
- Closed kinetic chain exercises: mini squats, weight shifts 0-30°

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

Postoperative Day 2 to 3

Brace

- Locked at 0° extension for ambulation and unlocked for sitting, etc.

Weight bearing

- Two crutches, weightbearing as tolerated

Range of Motion

- Remove brace to perform range of motion exercises 4 to 6 times a day

Exercises

- Multi-angle isometrics at 90° and 60° (knee extension)
- Knee extension 90-40°
- Overpressure into extension (knee extension should be at least -° to slight hyperextension)
- 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)

Ice and Elevation

- Ice 20 minutes out of every hour and elevate leg with knee in full extension

Postoperative Day 4 to 7

Brace

- Locked at 0° extension for ambulation and unlocked for sitting, etc.

Weightbearing

- Two crutches, weightbearing as tolerated

Range of Motion

- Remove brace to perform range of motion exercises 4-6 times per day, knee flexion 90° by day 5, approximately 100° by day 7

Exercises

- Multi-angle isometrics at 90° and 60° (knee extension)
- Knee extension 90-40°
- Overpressure into extension (full extension 0° 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°
- CKC squats/weight shifts with repositioning on sports RAC

Muscle Stimulation

- Electrical muscle stimulation (continue 6 hours daily)

Ice and Elevation

- Ice 20 minutes out of every hour and elevate with knee in full extension

Criteria to Progress to Phase II

- Quad control (ability to perform good quad set and SLR)
- Full passive knee extension
- PROM 0-90°
- Good patellar mobility
- Minimal joint effusion
- Independent ambulation

II. EARLY REHABILITATION PHASE (Week 2-4)

Week 2

Goals

- Maintain full passive knee extension (at least 0 to 6-7 hyperextension)
- Gradually increase knee flexion
- Diminish swelling and pain
- Muscle control and activation
- Restore proprioception/neuromuscular control
- Normalize patellar mobility

Brace

- Continue locked brace for ambulation

Weightbearing

- As tolerated (goal is to discontinue crutches 10-14 days postop)

Passive Range of Motion

- 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 (0-60°)
- Knee extension 90-40° degrees
- Half squats (0-40°)
- Weight shifts
- Front and side lunges
- Bicycle (if ROM allows)
- Proprioception training
- Overpressure into extension
- Passive range of motion from 0 to 100°
- Patellar mobilization
- Well leg exercises
- Progressive resistance extension program – start with 1 lb and progress 1 lb per week

Proprioception/Neuromuscular Training

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

Swelling control

- Ice, compression, elevation

Week 3

Brace

- Continue locked brace for ambulation until week 4

Passive Range of Motion

- Continue range of motion stretching and overpressure into extension (ROM should be 0-100/105°)

Exercises

- Continue all exercises as in week two
- Passive range of motion 0-105°
- Bicycle for range of motion stimulus and endurance
- 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)
- StairStepper machine
- Progress proprioception drills, neuromuscular control drills
- Continue passive/active reposition drills on sports RAC (CKC, OKC)

Criteria to Progress to Phase III

- Active range of motion 0-115°
- Quadriceps strength 60% > contralateral side (isometric test at 60% knee flexion)
- Minimal to no full joint effusion
- No joint line or patellofemoral pain

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

Goals

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

Brace

- No immobilizer or brace, may use knee sleeve to control swelling/support

Range of Motion

- Self-ROM 94-5 times daily using the other leg to provide ROM), emphasis on maintaining 0° passive extension
- PROM 0-125° at w4 weeks

Week 4

Brace

- Discontinue use of locked brace at end of week 4
- Use unlocked brace for weeks 5-6

Exercises

- Progress isometric strengthening program
- Leg press (0-100°)
- Knee extension 90 to 40°
- 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 0-60°
- Standing toe calf raises
- Seated toe calf raises
- Biodex stability system (balance, squats, etc.)
- Proprioception drills
- Bicycle
- StairStepper 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

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

- 209 and 30 lb. anterior and posterior test

Exercises

- Continue all exercises listed in Weeks 4-6
- Leg press sets (single leg) 0-100° and 40-100°
- Plyometric leg press
- Perturbation training
- Isokinetic exercises (90 to 40°) (120° to 240°/second)
- Walking program
- Bicycle for endurance
- Biodex stability system
- Initiate active knee flexion with "light" resistance

Week 10

KT 2000 Test

- 20 and 30 lb and manual maximum test

Isokinetic Test

- Concentric knee extension/flexion at 180° and 300°/second

Exercises

- Continue all exercises listed in Weeks 6, 8, ad 10
- Plyometric training drills
- Continue stretching drills
- Progress strengthening exercises and neuromuscular training

Criteria to Progress to Phase IV

- AROM 0-125° or greater
- Quad strength 75% of contralateral side, knee extension flexor:extensor ratio 70% to 75%
- No change in KT values (comparable with contralateral side, within 2 mm)
- No pain or effusion
- Satisfactory clinical exam
- 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%
- Hop test (80% of contralateral leg)
- Subjective knee scoring (modified Noyes System) 80 points or better

IV. ADVANCED ACTIVITY PHASE (Week 10-16)

Goals

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

Exercises

- May initiate running program (weeks 10-12)
- May initiate light sport program (golf)
- Continue all strengthening drills
  - Leg press
  - Wall squats
  - Hip bad/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
  - Sports RC repositioning on tilt board

Week 14-16

- Progress program
- Continue all drills above
- May initiate lateral agility drills
- Backward running

Criteria to Enter Phase V

- Full range of motion
- Unchanged KT 2000 Test (within 2.5 mm of opposite side)
- Isokinetic test that fulfills criteria
- Quadriceps bilateral comparison (80% or greater)
- Hamstring bilateral comparison (110% or greater)

- Quadriceps torque/body weight ratio (55% or greater)
- Hamstrings/quadriceps ratio (70% or greater)
- Proprioceptive test (100% of contralateral leg)
- Functional test (85% or greater of contralateral side)
- Satisfactory clinical exam
- Subjective knee scoring (modified Noyes System) (90 points or better)

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

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

6 Month Followup

- Isokinetic test
- KT 2000 test
- Functional test