Patellar Tendon Debridement and Repair Rehabilitation Protocol

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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
- Balance training 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

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 & sleeping
Unlock brace while sitting

Weight Bearing – Two crutches, weight bearing as tolerated

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

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

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

Postoperative Day 2 to 14

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

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)
*Overpressure into extension (knee extension should be at least 0 degrees to slight hyperextension)

*Patellar mobilization

*Ankle pumps
*Straight leg raises (3 directions)
*Quadriceps isometric setting

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

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

II. EARLY REHABILIATION 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 2

Brace – Continue locked brace for ambulation & sleeping

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

Passive Range of Motion – Self-ROM stretching (4-5 times daily), emphasis on maintaining full, passive
range of motion
* Restore patient's symmetrical extension

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
*Hamstring Curls standing (active ROM)
*Bicycle (if ROM allows)
*Proprioception training
*Overpressure into extension
*Passive range of motion from 0 to 100 degrees
*Patellar mobilization
*Well leg exercises

Swelling control – Ice, compression, elevation

Week 3

If Patient continues to use brace unlock brace for ambulation

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

Exercises: *Continue all exercises as in week two
*Passive Range of Motion 0-105 degrees
*Bicycle for range of motion stimulus and endurance
*Pool walking program (if incision is closed)
*Eccentric quadriceps program 40-100 (isotonic only)
*Progress Proprioception drills, neuromuscular control drills

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) Minimal to no full joint effusion
4) No patellofemoral pain

Goals: Restore full knee range of motion (5- 0 to 125 degrees) symmetrical motion
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 (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 4-5

Exercises:
*Progress isometric strengthening program
*Leg Press (0-100 degrees)
*Knee extension 90 to 40 degrees
*Hamstring Curls (isotonics)
*Hip Abduction and Adduction
*Hip Flexion and Extension
*Lateral Step Ups
*Front Step Downs
*Wall Squats
*Vertical Squats
*Standing Toe Calf Raises
*Seated Toe Calf Raises
*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

Week 6-7

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

Week 8-9

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
degrees/second)
*Bicycle for endurance
*Stair Stepper Machine for endurance
*Training on tilt board

Week 10

Exercises: *Continue all exercises listed in Weeks 6, 8 and 10
*Plyometric Training Drills
*Continue Stretching Drills
*Progress strengthening exercises and neuromuscular training

IV. ADVANCED ACTIVITY PHASE (Week 10-14)

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 pain or effusion
4) Satisfactory clinical exam

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

Exercises: *May initiate running program (weeks 10-12) (Physician Decision)
*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 lunges
- Tilt board drills
- Sports RAC repositioning on tilt board

V. RETURN TO ACTIVITY PHASE (Month 14-22)

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
*Progress running and agility program
*Progress sport specific training
- Running/cutting/agility drills
- Gradual return to sport drills