VANDERBILT HEALTH

Eric Bowman, MD
Vanderbilt Bone and Joint
206 Bedford Way
Franklin, TN
(615) 790-3290

Patellar Tendon Debridement & Repair
Rehabilitation Protocol

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 hour
- 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
- elevate leg with knee in full extension

<u>EARLY REHABILIATION PHASE (Week 2-4)</u>

Criteria to Progress to Phase II

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

<u>Week 2</u>

Brace:

- Continue locked brace for ambulation can take off for 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

<u>Week 3</u>

Brace:

- Discontinue Brace

Passive Range of Motion:

- Continue range of motion stretching and overpressure into extension (ROM should be 0- 100/105 degrees)
- Restore patient's 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 5

PROGRESSIVE STRENGTHENING/NEUROMUSCULAR CONTROL PHASE (Week 4-9) (Step A-D)

Criteria to Enter Phase III

- Active Range of Motion 0-115 degrees
- Quadriceps strength 60 % > contralateral side (isometric test at 60 degree knee flexion)
- Minimal to no full joint effusion
- 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

<u>Step A</u>

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

Step B

Exercises:

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

Step C

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

Step D

Exercises:

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

ADVANCED ACTIVITY PHASE (Week 9-12)

Criteria to Enter Phase IV

- AROM 0-125 degrees or greater
- Quad strength 75% of contralateral side, knee extension flexor:extensor ratio 70% to 75%
- No pain or effusion
- 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

RETURN TO ACTIVITY PHASE (Week 10+)

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