

## Recurrent Unremitting Patellar Tendonitis/ Tendonosis Rehabilitation Program

### I. Phase I

**Goals:** Diminish pain and inflammation  
Promote tendon healing  
Improve quadriceps strength  
Enhance flexibility  
Control functional stresses

**Treatment Regimen:**

- Hot packs applied to knee
  - Ultrasound to patellar tendon
  - Transverse friction massage
  - Warm-up bicycle (10-12 min.)
  - Stretch (hamstrings quadriceps, gastroc)
  - Application of pain stimulation to each side of patella tendon or infra-patellar fat pad x 10 minutes
    - Electrical stimulation parameters
      - Waveform: Russian
      - Frequency: 2500 Hz pulse; width: 200 MS; Rate: 50/sec
      - 60 pulses per second (pps)
      - duty cycle 10 on/10 off; ramp of 1 second
    - pad placement- 1"x1" electrodes placed on each side of inflamed/painful tendon (After 3 minutes, palpate tendon, should be less painful and becoming numb, if not, move electrodes)
  - Quadriceps strengthening program (Level I)
    - E-stim to quadriceps\*
    - Quad sets\*
    - SLR flexion\*
    - Hip adduction/abduction\*
    - Vertical squats (tilt board)
    - Hip flexion/extension
    - Toe-calf raises
    - Bicycle (15-20 min.)
- \*Monitor subjective pain level response (goal level 5-7)
- Pool program
  - Stretch (aggressive stretching)
  - Laser
  - Cryotherapy

### II. Phase II

Emphasize eccentric training for quadriceps

**Goals:** Gradual increase stress to patellar tendon  
Enhance quadriceps strength  
Improve flexibility  
Gradual increase functional activities

**Treatment Regimen:**

- Hot packs or warm whirlpool
- Ultrasound to patellar tendon
- Transverse message to patellar tendon
- Active warm-up bicycle (10-12 min.)
- Stretch (hamstrings, quadriceps, gastroc)
- Application of pain stimulation
- Strengthening program (Level II)
  - Leg press (90-0°) and (45-100°)-(emphasize eccentrics)
  - Hip add/abduction
  - Hip flex/extension
  - Wall squats (0-70°)
  - Lateral step-up (foam)-(emphasize eccentrics)
  - Front lunges- (emphasize back leg)
  - Knee extension (progress from eccentric to concentric)-(emphasize eccentrics)
  - Leg press (progress from concentric to eccentric)
  - Hamstring curls
  - Toe-calf raises
  - Bicycle/stairmaster
  - Control forces to knee
    - Enhance hip & ankle strength & stability
    - Core stability
- \*Monitor subjective pain level response (goal 5-7)
- Aggressive stretching
- Laser
- Cryotherapy

**III. Phase III**

- Goals:** Gradually increase applied loads  
Functional training  
Enhance lower extremity strength  
Improve flexibility

**Treatment Regimen:**

- Hot packs to knee
- Ultrasound to patellar tendon
- Transverse message
- Active warm-up
- Stretch
- Application of noxious electrical stimulation protocol
- Strengthening program (Level III)
  - Continue previous exercises
  - Continue eccentric progression
  - Leg press
  - Hip machine
  - Wall squats
  - Tilt board squats
  - Lateral step-ups
  - Front step-downs
  - Agility drills

- Lunges onto unstable surface
- Step-ups on unstable surface
- Single leg balance on unstable surface
- Plyometric program
  - Initiate two-legged jumps
  - Progress to one-legged jumps
- \*Monitor pain level (goal level 5-7)
- Progress to running program
  - Backward running
  - Lateral movements
  - Forward running
- Laser Therapy
- Stretching

**IV. Phase IV**

- Goals:**
- Sports specific training
  - Continue stretching/flexibility program
  - Continue strengthening program

**Treatment Regimen:**

- Heat and ultrasound (if needed)
- Active warm-up
- Stretching
- Continue strengthening program
- Initiate sport specific drills and training
- Progress to practice situation
- Stretch
- Ice (if needed)

**Pain (noxious) Stimulation Protocol**

Clinical muscular electro-stimulator

- Specific parameters
  - Frequency: 2500 Hz pulse width: 200MS
  - Rate: 60 pulses per second (pps)
  - Ramp: 1 sec
  - Waveform: Russian
  - Duty cycle: 10 on/10 off
  - Time: 12 minutes

- **Electrode placement**

- 1" X 1" electrodes placed on each side of painful tendon or infrapatella fat pad

\* after 3 minutes palpate tendon, if not becoming less painful or numb, move electrodes