Rehab Practice Guidelines for: Patellar Tendinopathy

Diagnostic Hallmarks:
- Pain localized to inferior pole of patella
- Pain that increases with increased load on knee extensors, particularly during plyometric type activities involving the knee (e.g. jumping)

Differential Diagnosis:
- Fat pad irritation
- Patellofemoral pain
- Joint pain
- Growth plate injuries in pediatric population

Assessment to include:
- Single leg decline squat test\(^2,3\)
  - perform 2 single leg squats from 0-50° on decline board (angle 25°)
  - rate pain 0-10
- Thorough kinetic chain assessment, including jumping, hopping and squatting mechanics
- Quadriceps strength testing
  - Using mechanical dynamometer at 60°, or angle of comfort if painful
  - Use Burst super imposition technique if appropriate; use clinical judgment and monitor pain
- Hip strength testing (with hand-held dynamometer)
- Outcome Measure: VISA-P\(^4\)

Use Pain Monitoring Model\(^5\) for Progression:
- Visual Analog Scale (VAS) 0-10

<table>
<thead>
<tr>
<th>No pain</th>
<th>0</th>
<th>2</th>
<th>5</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe Zone</td>
<td>Acceptable Zone</td>
<td>High risk zone</td>
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- The pain is allowed to reach 5/10 on the VAS during exercises
- The pain after the whole exercise program is allowed to reach 5/10 on the VAS but should subside to baseline by the following morning
- Baseline pain is not allowed to increase from week to week

<table>
<thead>
<tr>
<th>Phase</th>
<th>Initiate when:</th>
<th>Treatment Ideas</th>
<th>Dosage and Progression</th>
</tr>
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<tbody>
<tr>
<td>Phase I: Acute</td>
<td>Pain with isotonic loading is &gt;5/10</td>
<td>-Isometric exercises: Knee Extension between 30-60° Spanish Squats between 45-90° Wall Sits between 45-90° -Address hip strength deficits as indicated -Noxious stim protocol(^\wedge) -NMES* to the quadriceps if QI&lt;80%</td>
<td>-Isometrics: 5x45° holds(^\wedge) -Perform daily if pain returns to baseline</td>
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</tbody>
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University of Delaware Rehab Practice Guidelines
Updated July 2016
### Phase II: Recovery

| Pain with isotonic loading is <5/10 | Isotonic exercises  
| | Knee Extension  
| Sit to Stands  
| Heavy Slow Resistance (HSR) training  
| Leg Press  
| Squat  
| Hack Squat  
| Continue hip strengthening, noxious stim and NMES as indicated | All exercises performed: bilaterally, every other day  
| | HSR: 3-4 sets, progress from 15 RM → 6RM, 90-0°, complete with 3 sec eccentric phase, 3 sec concentric phase  
| | Can continue Phase I exercises on off days |

### Phase III: Rebuilding

| Tolerating decline squat of involved limb with <5/10 pain | Progress Phase II exercises  
| | Add:  
| Split Squat  
| Step-Downs (Lateral & Forward)  
| Isokinetics (concentric/eccentric)  
| Decline Squat Program  
| Progress Phase II exercises to eccentric (2 up, 1 down) then unilateral  
| Progress 3x8 → 3x15  
| Decline Squat Program: 3x15, 1x/day |

### Phase IV: Return to Activity

| Tolerating load with plyometric activities that replicate training demands | Jump/Landing training  
| | Acceleration  
| | Deceleration  
| | Cutting  
| | Sport specific training | Progressively increase volume and then intensity  
| | Progress through training drills then full competition |

**MVIC:** Maximum voluntary isometric contraction, **NMES:** Neuromuscular electric stimulation, **QI:** Quad Index, **HSR:** Heavy slow resistance

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**Noxious stim protocol:** Pulse width >150us, frequency >50 pps, 2 sec ramp, 12 sec on, 8 sec off, 10-15 min total, max tolerance (aim for 3x sensory threshold)

**NMES Guidelines:**
- Electrodes placed over proximal lateral quadriceps and distal medial quadriceps.
- Stimulation parameters: 400 us (2500Hz), 75 pps, 2 sec ramp, 12 sec on, 50 sec off, intensity to max tolerable at least 50% MVIC, 10 contractions per session, continue until quadriceps strength MVIC is 80% of uninvolved.
- Stimulation performed isometrically at 60°, or angle of comfort if painful.

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**References**


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This Clinical Guideline may need to be modified to meet the needs of a specific patient. The model should not replace clinical judgment.
Decline Squat Test 1

Decline Squat Test 2

Spanish Squat Lateral

Spanish Squat Anterior

Hack Squat