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  
  - 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

**Outcome Measure**: VISA-P

**Use Pain Monitoring Model 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>
<th>Worst pain imaginable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe Zone</td>
<td>Acceptable Zone</td>
<td>High risk zone</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- 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

**Phase I: Acute**  
- Pain with isotonic loading is >5/10
- 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
- NMES to the quadriceps if QI<80%

**Dosage and Progression**
- Isometrics: 5x45” holds
- Perform daily if pain returns to baseline
### Phase II: Recovery

| Pain with isotonic loading is <5/10 | -Isotonic exercises  
  Knee Extension  
  Sit to Stands  
  Heavy Slow Resistance (HSR) training6:  
  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 Program7 | -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

---

**^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 uninjured.
- Stimulation performed isometrically at 60°, or angle of comfort if painful.

---

**References**