Assessment & Treatment of Achilles tendinopathy

Lee Herrington PhD MCSP
Senior Lecturer in Sports Rehabilitation, University of Salford, UK
Physiotherapist Great Britain Women’s Basketball team
Physiotherapist, English Institute of Sport

Achilles Tendinopathy

• Background
• Runners x30> risk (Kujala et al 2005)
• Why?
• Tendon injury result from fatigue failure
• Repetitive loads in physiological range
• Insufficient recovery create micro-tears
Achilles Tendinopathy

- Injury model
- Mechanical loading beyond tensile strength
- Micro-failure resultant inflammation (Millar et al 2010)
- Failed healing response (with continued loading)
- Increased load on remaining fibres
- Further micro-failure
- Dysrepair then degenerate change (Kujala et al 2007)

Achilles Tendinopathy

- Tensile strength
- Tensile strength is 4x > max force attached muscle can produce
- Rarely an acute event causes injury in normal tendon
Achilles Tendinopathy

- Tensile strength typical values
- Failure 10-14000N
- Running 4-6000N
- Jumping 4-5000N
- Hopping 5000N
- Cycling 4000N
- Heel drop (single leg)
  - Slow 2000N
  - Fast 3000N

Achilles Tendinopathy

- Loading the Achilles tendon
- Motor units and tendon fasicles
- Velocity & stiffness
- Stiffness & age
Achilles Tendinopathy

• **Types** (Cook, 2009)

• **Mid portion**
  – Reactive
  – Dysrepair
  – Degenerate

• **Insertional**
  – Differentiate from bursae, posterior impingement & Haglunds deformity (enlarged superolateral tubercle of calcaneus)

**Mid portion typical presentations**

• **Reactive**
  – Younger (15-25yrs)
  – Rapid onset generally related to load
  – Swelling of tendon 3-4cm
  – Aggravated by exercise

• **Tendon dysrepair**
  – Young adult (20-35yrs)
  – Past history with load related exacerbations
  – Swelling of tendon 3-4cm
  – Less irritable

• **Degenerative**
  – Older (30-60yrs)
  – Long history of symptoms
  – Variable swelling and lumps/bumps
  – Exhibit unloading strategies or atrophy
### Mid portion typical presentations

<table>
<thead>
<tr>
<th></th>
<th>Reactive</th>
<th>Tendon dysrepair</th>
<th>Degenerative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tendon response</strong></td>
<td>Adapting to load</td>
<td>Attempting to heal</td>
<td>Gives up on healing</td>
</tr>
<tr>
<td><strong>Pathology</strong></td>
<td>Cells active increased ground substance production</td>
<td>Cells active continues GS and collagen production but fails to gain structure</td>
<td>Cells die, no protein production</td>
</tr>
<tr>
<td><strong>Age/load</strong></td>
<td>Younger or short term load</td>
<td>Older and/or ongoing strain</td>
<td>Oldest and/or further strain</td>
</tr>
<tr>
<td><strong>Capacity to repair</strong></td>
<td>Full</td>
<td>Limited</td>
<td>None May progress to rupture</td>
</tr>
<tr>
<td><strong>Prevalence</strong></td>
<td>Common, not seen</td>
<td>Less common, presents clinically</td>
<td>Uncommon, presents clinically</td>
</tr>
<tr>
<td><strong>Pain</strong></td>
<td>If extensive, very painful</td>
<td>Sometimes</td>
<td>Often grumbly</td>
</tr>
</tbody>
</table>

### Achilles Tendinopathy
Achilles Tendinopathy

- Eccentric exercise
- Knee extended & flexed bi & unilateral (Herrington & McCulloch, 2007)
Achilles Tendinopathy

• **Eccentric exercise: Pros & cons**

• **Successful** (Herrington & McCulloch 2007; Roos et al 2004; Sibernagel et al 2001) but not always in sedentary populations (Rompe et al 2007) or in long term (Rees et al 2009)

• **Significant care with reactive tendons** (Cook, 2009)

---

Achilles Tendinopathy

• **Treatment**

• **Beyond heel raisers**

• **Fast heel drop (weighted)** generate 3500N

• **Running 4-6000N**

• **Insufficient loading**

• **Why reoccurrence is high?**

• **Why eccentrics?** (Rees et al 2009)

• **Just enough education (“stimulus”) to perform**
Achilles Tendinopathy

• Treatment model
• Identify & remove negative external forces
• Establish a baseline (stable)
• Determine tensile loading start point
  – Consider nature & volume
• Use symptoms as guide to loading
• Use maximum tolerated loads
• Progress load regularly; challenge the tissue
• Employ specificity
  – Intensity, volume, velocity & nature of contraction

Achilles Tendinopathy

• Treatment planning
• Eccentric programmes
  – Load, volume & velocity manipulations
• Load-force acceptance
• Plyometric: stretch-shortening
• Whole kinetic chain program
• Running
  – When, how much, how often?
Achilles Tendinopathy

- Case study; female professional basketball player
- left achilles tendinopathy
  - VISA A score 53
  - EMS & significant difficulty getting going
  - Heel raise x20 4/10 VAS, hop land x5 4/10 VAS
- High training load 11 two hour sessions per week
- Poor lower limb motion control & ROM
- Entering competition phase in 2 weeks
  - High minute player (30+)
  - Game every 3 days, travel between

Achilles Tendinopathy

- Case study
- left achilles tendinopathy: treatment
- Issues
- When to apply load?
- What to work on? when? Performance impacts?
- Solutions?
- Short term
  - improve tissue compliance
  - Improve eccentric control through kinetic chain
Achilles Tendinopathy

- Case study
- Left achilles tendinopathy: result
- End of competition phase
- VISA A score 87
- EMS minimal, able to warm up effectively
- Avg 28 mins & 10 pts per game
- Long term

Assessment & Treatment of Achilles tendinopathy

- Any questions?
- Contact: lee@knee-rehab.co.uk
- Thank you