An investigation into accelerated rehabilitation strategies following a rupture of the Achilles tendon

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<table>
<thead>
<tr>
<th>AIM</th>
<th>FELLOWSHIP YEAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Systematically review and summarise what immediate weight bearing orthotics and rehabilitation methods are used.</td>
<td><img src="image1" alt="Progress to Date" /></td>
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<tr>
<td>2. Evaluate how different immediate weight bearing orthotics and rehabilitation methods affect gait parameters within healthy participants.</td>
<td><img src="image2" alt="Progress to Date" /></td>
</tr>
<tr>
<td>3. Evaluate healing characteristics, gait parameters and functional outcomes using current rehabilitation methods.</td>
<td><img src="image3" alt="Progress to Date" /></td>
</tr>
<tr>
<td>4. Evaluate healing characteristics, gait parameters and functional outcomes following a change in rehabilitation methods.</td>
<td><img src="image4" alt="Progress to Date" /></td>
</tr>
<tr>
<td>5. Evaluate elements of validity of a new patient reported functional outcome measure.</td>
<td><img src="image5" alt="Progress to Date" /></td>
</tr>
</tbody>
</table>

**INTRODUCTION**

Rupture of the Achilles tendon is a disabling condition, affecting 15 per 100,000 people each year. Advances in rehabilitation have demonstrated that immediate weight-bearing within an orthotic is safe, resulting in a quicker return to functional activities when compared with ‘traditional’ plaster casts. However, a Cochrane review has highlighted that there are wide variations in the type of orthotics available and rehabilitation methods used. Therefore, the authors concluded that further research is required into this new and emerging area.

**AHP TRAINING FELLOWSHIP AIMS**

The overall aim of this AHP training fellowship is to develop a written protocol for a randomised controlled trial comparing immediate weight bearing rehabilitation strategies within patient who have sustained a rupture of their Achilles tendon.

**YEAR ONE PROGRESS TO DATE**

**AIM ONE** The electronic databases MEDLINE, EMBASE, CINAHL, AMED and the register of current controlled trials were searched up to March 2010. Two hundred and fifteen articles were screened, nine were included. These studies, presented the results of 424 patients; 236 who had surgery and 188 who were managed non-operatively. There were a range of rehabilitation protocols that were defined by four interacting components. These components consisted of the degree of maintained plantarflexion, the type of orthotic worn and how long it was worn for. There were no studies that directly compared rehabilitation methods.

**AIM TWO** Fifteen healthy participants with no lower limb pathology were evaluated. Pressure data was obtained using in-shoe pressure inserts (Figure 1), with an F-Scan system. Range of ankle movement was also collected using an electrogoniometer. Three orthotic designs were evaluated, containing three, two, one and no heel wedge inserts. The sequence of trials was randomised for each participant. Since the Achilles tendon connects the gastrocnemius and soleus muscles to the calcaneus to permit transmission of plantarflexion torque, data analysis was focused upon forefoot and heel pressure, as a percentage of the contra-lateral limb. Additionally, the duration of terminal stance and pre-swing phases as a proportion of the total stance component were analysed.

**ONE WAY ANALYSIS OF VARIANCE**

One-way analysis of variance demonstrated that the type of orthotic design and the number of heel wedge inserts had a significant effect on all measured parameters. rocker bottom styled orthotics (Figure 2) combined with a higher number of inserted heel wedges, prevented production of forefoot pressures, increased heel pressures and decreased the amount of time spent in the terminal stance and pre-swing phase of the gait cycle (p<0.05). These findings were in contrast to in-shoe carbon fibre orthotic designs (Figure 3). Each of these parameters were also significantly correlated (p<0.05).

The purpose of an orthotic for this injury is to provide weight bearing within a protected range of movement. However, the findings of this study suggest that the balance between protected weight bearing and functional loading require further research within a clinical context.

**YEAR TWO PROGRESS TO DATE**

Ethical approval for aims three and four have been obtained and are currently in progress.

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