LOTHIAN PHYSIOTHERAPY ORTHOPAEDIC GUIDELINES

Achilles Tendon Rupture – Conservative Management
Accelerated Rehabilitation 8-week protocol

Introduction
Procedure: Conservative Management of Tendo-Achilles Rupture – Accelerated 8-week protocol
Indications for Procedure: Tendo-Achilles Rupture
Expected Length of Stay: n/a
Surgeons: All orthopaedic trauma surgeons

Scope of Practice
These guidelines are designed to guide physiotherapists when treating patients following conservative management of Achilles rupture using the accelerated 8-week rebound boot protocol. These guidelines were developed by a process of systematic review of the current evidence based literature and medical and peer consultation. They were correct at the time of writing. The guidelines should be used in conjunction with the clinical reasoning skills of the physiotherapist and patients should always be treated on a case by case basis.

Aim
The aim of these guidelines is to provide physiotherapy staff with a series of recommendations from the current evidence base to assist them in the management of patients who have sustained an Achilles tendon rupture which has been managed conservatively using the accelerated 8-week Ossur rebound boot protocol.

Literature review question
Is there any evidence to guide conservative management and rehabilitation following Achilles tendon rupture?

Results
The previous guidelines (Version 1, 2009 and Version 2, 2013) outline that there is limited evidence (one Randomised Control Trial) that immediate protected weight bearing in a pneumatic walker has no detrimental effect on outcome and one Systematic Review that specifically outlines physiotherapy management stating that “post Achilles tendon rupture, a key issue is atrophy of the gastroc-soleus complex and consequent gait abnormalities both of which may be reduced with immediate weight bearing rehabilitation within an orthotic (Kearney et al, 2012)

The most recent literature review has found no clear evidence to further guide the physiotherapy management of a conservatively managed achilles tendon rupture. However, multiple studies (Ref’s 2, 3 & 4, 5) have noted no statistically significant difference between outcomes in early weight-bearing vs. Non weight-bearing groups in conservatively managed Achilles tendon ruptures, and one RCT found that “plaster casting was not found to be superior to early weight-bearing in a functional brace” (Costa et al, 2020). Indeed these authors demonstrated that a functional brace is therefore considered to be safe and cost effective way of conservatively managing Achilles tendon ruptures. This supports the initial 8 week period of early weight bearing in a Ossur Rebound boot prior to physiotherapy commencing in this guideline.

There is no current evidence recommending the ideal timescales or intensity of range of movement, strengthening, proprioception, sports and occupation specific exercise following the conservative accelerated management (in a Ossur Rebound boot) of an Achilles tendon rupture. Therefore the following recommendations are based on protocols and opinions of experts in the field.
Recommendations
At the time of writing this guideline a clinical trial is being carried out in NHS Lothian comparing 2 groups. All patients in NHS Lothian that are deemed appropriate for conservative management are either:

1. Placed in an Ossur Rebound Boot and allowed to FWB in this boot for 8 weeks. 0-4 weeks there is a 4cm wedge, 4-6 weeks there is a 2cm wedge, and 6-8 weeks there are no wedges and the ankle is in neutral in the boot. OR

2. Placed in an Ossur Rebound Boot and allowed to FWB in this boot for 8 weeks. 0-4 weeks there is a 3cm wedge, 4-6 weeks there is a 1.5cm wedge, and 6-8 weeks there are no wedges and the ankle is in neutral in the boot.

The boot is to be worn continuously for 0-8 weeks including when in bed.

Both of the above patient groups are allowed to FWB in the boot.

Note: Weight-bearing status may differ between consultants therefore please check for specific instructions.

Phase 1: Immediate Post-injury – 8 weeks (Initial Physiotherapy Out-Patient Appointment at 8 weeks)

<table>
<thead>
<tr>
<th>Goals</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure patient is safely mobilising with crutches</td>
<td>Gait Re-education (C)</td>
</tr>
<tr>
<td>Maintain quadriceps and hamstring and gluteal function</td>
<td>Non-weight bearing isometric and isotonic exercises (C)</td>
</tr>
<tr>
<td>Ensure patient is aware of common complications</td>
<td>Educate patient regarding signs and symptoms (C)</td>
</tr>
<tr>
<td>Minimise swelling</td>
<td>Advice re elevation (C)</td>
</tr>
</tbody>
</table>
Phase 2: 8 weeks post injury – 10 weeks post injury
Supervised physiotherapy begins at 8 weeks after boot has been removed.

Precautions:
- Avoid full WB stretching of tendon
- Avoid using eccentric loads which exceed the concentric ability

<table>
<thead>
<tr>
<th>Goals</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimise swelling</td>
<td>Advice re elevation and ice (C)</td>
</tr>
<tr>
<td>Progress mobility as able</td>
<td>Gait re-education progressing as able.</td>
</tr>
<tr>
<td>Increase ankle ROM</td>
<td>Active ROM for the ankle Functional mobilisation(C)</td>
</tr>
<tr>
<td>Increase Neuromuscular Control</td>
<td>Balance exercises – initially weight transfer practice and progress as able (C)</td>
</tr>
</tbody>
</table>

Phase 3: 10 weeks post injury – 12 weeks post injury

Precautions:
- Avoid full WB stretching of tendon
- Avoid using eccentric loads which exceed the concentric ability

<table>
<thead>
<tr>
<th>Goals</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimise swelling</td>
<td>Advice re elevation and ice (C)</td>
</tr>
<tr>
<td>Progress mobility as able</td>
<td>Gait re-education as able</td>
</tr>
<tr>
<td>Increase ankle ROM</td>
<td>Active ROM for the ankle Functional mobilisation(C) Begin gentle NWB dorsiflexion stretches slowly (C)</td>
</tr>
<tr>
<td>Increase Strength</td>
<td>Begin resistance band strengthening for the calf. Progress to Concentric/Eccentric heel raising through available range (Eccentric load equal to concentric load only) (C) Strengthen all lower limb muscle groups as indicated: open/closed chain gluteal hamstring and quadriceps exercises (C)</td>
</tr>
<tr>
<td>Increase Neuromuscular Control</td>
<td>Balance exercises – initially single leg static and progress as able (C)</td>
</tr>
</tbody>
</table>
Phase 4: 12 weeks post injury – 24 weeks post injury

Precautions:
- No Maximal Isokinetic testing until 24 weeks

<table>
<thead>
<tr>
<th>Goals</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restore full tendon extensibility</td>
<td>Progressive weight bearing calf stretches (C)</td>
</tr>
<tr>
<td>Increase strength through range</td>
<td>Continue to strengthen through full active range if motion (C)</td>
</tr>
<tr>
<td>Improve eccentric capacity</td>
<td>Eccentric calf exercises with loads that exceed the concentric ability (C)</td>
</tr>
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</table>

Phase 5: 24 weeks post injury +

<table>
<thead>
<tr>
<th>Goals</th>
<th>Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restore full occupational Occupation and sporting function</td>
<td>Occupation and sport specific rehabilitation including return to running (when patient’s calf strength is 80% or greater than uninvolved side)(C)</td>
</tr>
<tr>
<td></td>
<td>Commence early plyometric training e.g. skipping, double leg bounding (when patient’s calf strength is 80% or greater than the uninvolved side)(C)</td>
</tr>
<tr>
<td></td>
<td>Consider using 1 RM calf raise if no access to isokinetic testing(C)</td>
</tr>
<tr>
<td>Restore optimal calf strength concentrically and eccentrically</td>
<td>Isokinetic testing (N.B. Expect strength deficit of 15%)(C)</td>
</tr>
<tr>
<td></td>
<td>Consider using 1 RM calf raise if no access to isokinetic testing(C)</td>
</tr>
<tr>
<td>Full sports specific training and return to competitive sport</td>
<td>End stage sports specific rehabilitation (C)</td>
</tr>
</tbody>
</table>

**Expectations**

- Patients are expected to return to full function including sport at around 6 months post removal of cast.
- It is expected that there will be a 15% deficit of concentric and eccentric strength of the affected side if measured isokinetically usually due to weakness in inner range plantarflexion. (C)
Search Process
A systematic review of the current literature on conservative management of Achilles tendon rupture was carried out. The previous guidelines were published in 2013. These updated guidelines searched for relevant studies from 2013 to 2020. Using NHS Scotland Knowledge Network (Web of Science) the following databases (table 1) and search terms (table 2) are listed below. These terms were based partially on the terms used in the 2013 literature review for continuity, and modified to include other potential relevant factors or synonyms. The titles and abstracts of all identified studies were assessed to determine whether they were pertinent to the research question. Articles, which were not relevant to the research question and/or were duplicates, were discarded at this point.

Total number of articles selected: 44
Total number of articles discarded: 37

Critical Appraisal Tools: The Critical Appraisal Skills Program (CASP) tool was used to review the quality of the included Systematic Review.

<table>
<thead>
<tr>
<th>DATABASE</th>
<th>Inclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMBASE</td>
<td>2013 onwards, English language only</td>
</tr>
<tr>
<td>CINHAL</td>
<td>2013 onwards, English language only</td>
</tr>
<tr>
<td>AMED</td>
<td>2013 onwards, English language only</td>
</tr>
<tr>
<td>MEDLINE</td>
<td>2013 onwards, English language only</td>
</tr>
<tr>
<td>COCHRANE</td>
<td>2013 onwards, English language only</td>
</tr>
</tbody>
</table>

Table 1: Data bases

<table>
<thead>
<tr>
<th>Group 1 (structure)</th>
<th>Group 2 (event)</th>
<th>Group (treatment)</th>
<th>3</th>
<th>Group 4 (outcome)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achilles</td>
<td>Tendon</td>
<td>cast</td>
<td></td>
<td>Return to work</td>
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<tr>
<td>Rupture</td>
<td>equinus</td>
<td>Return to function</td>
<td></td>
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<tr>
<td>Tear</td>
<td>weightbearing</td>
<td>Tendon mechanics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury</td>
<td>management</td>
<td>Active movement</td>
<td></td>
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<td></td>
<td>Immob*</td>
<td>Passive movement</td>
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<tr>
<td></td>
<td>Eccentric</td>
<td>Outcome measures</td>
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<tr>
<td></td>
<td>Phys*</td>
<td>Tensile</td>
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<tr>
<td></td>
<td>Loading</td>
<td>Failure</td>
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<tr>
<td></td>
<td>Strength*</td>
<td>Collagen synthesis</td>
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<td></td>
<td>Brac*</td>
<td>Collagen matrix</td>
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<td></td>
<td>Surg*</td>
<td>Atrophy</td>
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<tr>
<td></td>
<td>Conservative*</td>
<td>Length</td>
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<td></td>
<td>Guideline*</td>
<td>Re-rupture</td>
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<td></td>
<td>Rehab*</td>
<td>Recurrent</td>
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<td></td>
<td>Operative*</td>
<td>Repeat</td>
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<td></td>
<td>Orthot*</td>
<td>Repeat</td>
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<tr>
<td></td>
<td>Heel raise</td>
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<tr>
<td></td>
<td>Wedge</td>
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</tr>
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</table>

Table 2: Search terms
References


Bibliography

Lothian Physiotherapy Orthopaedic Guidelines; Achilles Tendon Rupture – Conservative Management (2009)
### Appendix 1 Levels of Evidence

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>A1</td>
<td>Evidence from large randomised controlled trials (RCTs) or systematic review (including meta-analyses)†</td>
</tr>
<tr>
<td>A2</td>
<td>Evidence from at least one high quality cohort</td>
</tr>
<tr>
<td>A3</td>
<td>Evidence from at least one moderate size RCT or systematic review</td>
</tr>
<tr>
<td>B</td>
<td>Evidence from at least one RCT</td>
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<tr>
<td>C</td>
<td>Expert opinions</td>
</tr>
<tr>
<td>D</td>
<td>Laboratory Evidence*</td>
</tr>
</tbody>
</table>

† Arbitrarily, the following cut-off points have been used: large study size ≥50 patients per intervention group; moderate study size ≥30 patients per intervention group.

*Arbitrarily, added by Lothian Physiotherapy Musculoskeletal Network Group

Version 3  
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