

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 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)

Goals	Recommendations
Ensure patient is safely mobilising with crutches	Gait Re-education (C)
Maintain quadriceps and hamstring and gluteal function	Non-weight bearing isometric and isotonic exercises (C)
Ensure patient is aware of common complications	Educate patient regarding signs and symptoms (C)
Minimise swelling	Advice re elevation (C)

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

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

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

Goals	Recommendations
Minimise swelling	Advice re elevation and ice (C)
Progress mobility as able	Gait re-education as able
Increase ankle ROM	Active ROM for the ankle Functional mobilisation(C) Begin gentle NWB dorsiflexion stretches slowly (C)
Increase Strength	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)
Increase Neuromuscular Control	Balance exercises – initially single leg static and progress as able (C)

Phase 4: 12 weeks post injury – 24 weeks post injury

Precautions:

- No Maximal Isokinetic testing until 24 weeks

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

Phase 5: 24 weeks post injury +

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

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.

DATABASE	Inclusion Criteria
EMBASE	2013 onwards, English language only
CINHAL	2013 onwards, English language only
AMED	2013 onwards, English language only
MEDLINE	2013 onwards, English language only
COCHRANE	2013 onwards, English language only

Table 1: Data bases

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

Table 2: Search terms

References

1. **Kearney RS, McGuinness KR, Achten J, Costa ML;** (2012) A systematic review of early rehabilitation methods following a rupture of the Achilles tendon, *Physiotherapy*, 98, 24–32
2. **Costa M L, Achten J, Marian I R, Dutton S J, Lamb S E, Olliver B, Maredza M, Petrou S, Kearney R S (2020)** Plaster cast versus functional brace for non-surgical treatment of Achilles tendon rupture (UKSTAR): a multicentre randomised controlled trial and economic evaluation *The Lancet*, 395, 441- 448.
3. **Young S W, Patel A, Zhu M, van Dijck S, McNair P, Bevan W P, Tomlinson M (2014)** Weight-Bearing in the Nonoperative Treatment of Acute Achilles Tendon Ruptures *J Bone Joint Surg (Am)*, 96, 1073-1079.
4. **Mark-Christensen T, Troelsen A, Kallelose T, Weisskirchner B (2016)** Functional rehabilitation of patients with acute Achilles tendon rupture: a meta-analysis of current evidence *Knee Surg Sports Traumatol Arthrosc*, 24, 1852-1859.
5. **El-Akkawi A I, Joanroy R, Barfod K W, Kallelose T, Kristensen S S, Viberg B (2018)** Effect of Early Versus Late Weightbearing in Conservatively Treated Acute Achilles Tendon Rupture, *The Journal of Foot and Ankle Surgery*, 57, 346-352.
6. **Costa M L, MacMillan K, Halliday D, Chester R, Shepstone L, Robinson A H N, Donell S T (2006)** Randomised controlled trials of immediate weight-bearing mobilisation for rupture of the tendo Achilles *J Bone Joint Surg (Br)* 88-B: 69-79
7. **Khan R J K, Fick D, Keogh A, Crawford J, et al. (2005)** Treatment of Acute Achilles Tendon Ruptures: A Meta-Analysis of Randomised Controlled Trials *J Bone Joint Surg (Am)* Boston: Vol 87, Iss. 10: pg 2202, 9pgs

Bibliography

Lothian Physiotherapy Orthopaedic Guidelines; Achilles Tendon Rupture – Conservative Management (2009)

Appendix

Appendix 1 Levels of Evidence

A1	Evidence from large randomised controlled trials (RCTs) or systematic review (including meta-analyses)†
A2	Evidence from at least one high quality cohort
A3	Evidence from at least on moderate size RCT or systematic review
B	Evidence from at least one RCT
C	Expert opinions
D	Laboratory Evidence*

† 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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