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Non-surgical treatment of Achilles rupture: Does duration in functional weight bearing orthosis matter?

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ABSTRACT

Background: The treatment of acute Achilles tendon ruptures is continually being debated. The success of non-surgical regimes is now evident yet there remains a high rate of surgery in the United States of America and Scandinavia. Recent studies have investigated functional outcome rather than complication rates as primary outcome but the current data are still sparse.

We aimed to investigate whether there is any difference in functional outcomes between two dynamic regimes of differing durations for acute Achilles tendon ruptures.

Methods: The patients in the two groups were matched for age, gender, follow-up duration and mechanism of injury. Forty-four patients were managed in a regime of 11 weeks and another 44 patients for 8 weeks. Demographics, injury details, complications and functional outcome were recorded. The validated Achilles Tendon Rupture Score (ATRS) was used to assess functional outcomes. Minimum follow-up was 1 year.

Results: The 11-week group had a mean age of 50.8 years (range: 27–80) with 36 (82%) males. The 8-week group had a mean age of 52.0 years (range: 32–77) with 36 (82%) males. The mean ATRS for the 11-week group was 76.0 (range: 8–100). The mean ATRS for the 8-week group was 76.1 (range: 30–100). There were no re-ruptures in the 11-week group and one in the 8-week group. There were three episodes of venous thromboembolism in the 11-week group and four in the 8-week group.

Conclusion: A reduction in duration of dynamic rehabilitation for non-operative treatment of Achilles tendon rupture from 11 weeks to 8 weeks does not lead to a significant detriment in functional outcomes or complication rates.

1. Introduction

The Achilles tendon (AT) remains the commonest tendon ruptured, particularly following sporting activity, and the incidence of acute rupture is rising [11,21,25]. The treatment of such injuries continues to create debate with the main decision algorithm between surgical or non-surgical treatment methods, albeit with recent trends away from operative repair for acute primary ruptures [12,24,39]. Following non-surgical management there is a plethora of treatment protocols, each being individualised to surgeon, department or hospital. Studies have previously looked at surgery versus non-surgical regimes, use of cast immobilisation versus functional orthosis and whether to allow early weight bearing or not [5,17,20,37,38]. Overall no consensus has been reached upon an ideal treatment protocol but recent studies have shown promising results from immediate weight bearing non-surgical methods in functional rehabilitation [2,4]. Despite this there remains a high rate of surgery in United States of America and Scandinavia [3].

Systematic reviews have shown that overall complication rates are lower in non-surgically managed AT ruptures compared to surgically treated AT ruptures [20]. Non-surgical treatment has the benefits of avoiding operative risks including skin breakdown, infection and nerve damage. The reduced overall complication rate of non-surgically treated AT ruptures is offset by previously documented higher re-rupture rates. However, a recent meta-analysis showed no difference in re-rupture rate between surgery plus postoperative functional bracing (5%) and the sub-group of patients treated in non-operative accelerated rehabilitation regimes (8%) [14]. Many functional methods have been tried and tested with varying devices and regimes [17,19,33]. A Cochrane review demonstrated that patients treated with

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functional bracing fared better with regards to less time off work and quicker return to sporting activities when compared with plaster cast treatment [19]. In addition to this functional treatment with an orthosis is more work and lifestyle compatible [9,36]. Despite the attention upon functional outcomes following orthopaedic injuries, recent meta-analyses have focused on re-rupture rate and overall complications as outcomes rather than the functional results following AT rupture.

To date, no study has examined the optimum duration of functional mobilisation in a weight bearing orthosis in the management of acute AT ruptures. The purpose of our study was to compare the functional outcome, in AT rupture patients treated non-surgically with an immediate weight bearing functional orthosis, using two different regimes. Our hypothesis is that there is no difference in functional outcomes between rehabilitation duration of 11 or 8 weeks in an immediate weight bearing functional regime after a minimum of 1-year follow-up.

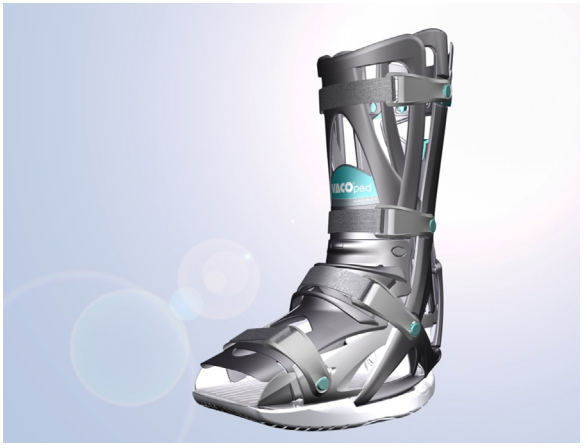

Fig. 1. Picture of the VACOped® boot (Oped Ag Ltd, Germany).

2. Methods

A departmental policy was implemented in January 2010 to standardise the treatment of acute AT rupture at our hospital. We used the VACOped® walking boot orthosis with immediate full weight bearing mobilisation. Initially there was caution about immediate weight bearing in an orthosis so a period of 11 weeks of functional mobilisation was used. A database was created and complications were recorded prospectively. In February 2011 the departmental policy was changed and the period of functional mobilisation was reduced to 8 weeks in line with literature at that time [27,38]. Both regimes are described in detail in Table 1. No significance was given to gap size between proximal and distal ends of the tendon to ration whether operative or functional treatment was best. This was due to the limited knowledge at the time about whether rupture gap affects decision-making. More recent research has shown little correlation between gap size and ATRS at 1 year following AT rupture [32].

All patients with a suspected AT rupture were assessed clinically by the Emergency Department, placed into a dorsal plaster slab and referred to the trauma & orthopaedic team at the time of presentation. Patients usually attended within 3 days but all attended within 1 week. Clinical assessment was performed which included calf squeeze test, palpation for rupture gap and ability to singe heel raise on examination in the orthopaedic outpatient clinic. If there was any clinical doubt regarding the rupture then radiological investigation (ultrasound or MRI) was used to confirm diagnosis. Once diagnosis was confirmed, by a member of the orthopaedic department, patients were placed in the functional VACOped® orthosis (Fig. 1) and the treatment protocol initiated.

Inclusion criteria for the study were primary acute AT ruptures (as defined by the clinical features above), a minimum follow up of 12 months, non-operative treatment, completed functional mobilisation in either VACOped® regime and completed ATRS form. Patients were excluded if they had a delayed presentation (>1 week) prior to institution of treatment, other injury in same limb, poly-trauma, open injury or underwent surgical repair. Surgical repair was undertaken for patients who wished to have surgery despite counselling by a foot and ankle surgeon or if there was a delay in presentation of >2 weeks. During this time period only six patients underwent surgical treatment.

We used the VACOped® boot (Oped Ag Ltd, Germany) as the functional orthosis in all cases (Fig. 1). At each time point on return to the clinic, the boot was removed, skin checks were made and the liner was changed. Boot adjustments were made according to the protocol in place by trained staff. All patients were allowed to fully weight-bear immediately once their orthosis was applied. The VACOped® achieves stability via an inner vacuum cushion that conforms to the shape of the leg by evacuating air, while the external shell provides rigidity. The boot can be locked at a fixed degree (ranging from 0 to 30°) or movements can be permitted within this range.

Following completion of the regime, patients returned for a clinical review and their boot was removed. Clinical assessment of the AT was performed, and if felt clinically intact, patients were referred to physiotherapy for strengthening exercises. This was the case for all patients involved.

The primary outcome measure was the Achilles tendon rupture score (ATRS). The ATRS questionnaire was administered by post a minimum of 12 months after the patient's regime was completed. The ATRS is a patient-reported outcome measure developed by Nilsson-Helander in 2007 [29]. It consists of 10 questions based on an 11 point Likert scale, where a total score of 0 is worst, and 100 is best. This questionnaire is perceived to be the only relevant, validated patient reported outcome score for AT ruptures [16]. We also prospectively collected data regarding secondary outcomes including re-ruptures, venous-thromboembolic (VTE) events or any other significant complication.

In total there were 88 patients treated in both regimes with the VACOped® boot. 72 (82%) were males. There were 44 patients treated for 11 weeks prior to the change in policy. Patients were only included in analysis if they returned a completed questionnaire. An age, sex and injury mechanism group were identified from patients treated in the 8-week regime. These patients were then contacted to be involved in the study. Table 2 shows the patient demographics and mechanism of injury of all cases in both groups.

Table 1
A table to show the duration in weeks spent in each position in the VACOPed® boot for both 11-week and 8-week regimes.

Regime	30° plantarflexion (static)	15° plantarflexion (static)	15–30° (dynamic)	0–30° (dynamic)
11 weeks (January 2010 to January 2011)	5	3	2	1
8 weeks (February 2011 to February 2012)	4	0	2	2

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