



The Journal of Bone & Joint Surgery

Journal club: 16 February 2012

Attendees: Mr A. Khan, Mr PJ. Harwood, Mr A. Rashid, Mr T. Goff, Mr B. Haughton, Mr S. Harrison
Leeds Orthopaedic Journal Club
Leeds General Infirmary, Great George Street, Leeds, United Kingdom

Theme: Foot & Ankle - Tendo Achilles Rupture

Presented Papers:

1. **Wallace RG, Heyes GJ, Michael AL.** The non-operative functional management of patients with a rupture of the Tendo Achillis leads to low rates of re-rupture. J Bone Joint Surg [Br] 2011;93-B:1362-6.
2. **Keating JF, Will EM.** Operative versus non-operative treatment of acute rupture of tendo Achillis: a prospective randomised evaluation of functional outcome. J Bone Joint Surg [Br] 2011;93-B:1071-8.
3. **Willits K, Amendola A, Bryant D, Mohtadi NG, Giffin JR, Fowler P, Kean CO, Kirkley A.** Operative versus nonoperative treatment of acute Achilles tendon ruptures: a multicenter randomized trial using accelerated functional rehabilitation. J Bone Joint Surg [Am] 2010;92-A:2767-75.

Foreword

The optimal management of Tendo Achilles rupture remains controversial with many differing opinions appearing in the literature. We felt it important to review some of the most recent published evidence on this topic to better understand current management strategies and debate the implications on our service delivery.

Paper 1 - Reviewer: Mr T Goff

Summary

1. Purpose

The aim of this study was to assess the long term rate of re-rupture for Tendo Achilles following management with a non-operative functional protocol.

2. Methods

This single centre, single surgeon, study was conducted between 1996 and 2008. All patients presenting with rupture of the tendo Achilles were referred to and assessed by the senior author. Non-operative management with a functional rehabilitation programme was instigated for

patients where tendon ends approximated well and who had not been delayed in their presentation. Some patients had ultrasound assessment, although this was not routine. The rehabilitation program followed up to 2 weeks in a full equinus non-weight bearing cast, before being switched to a pneumatic walker boot with heel raises which are sequentially reduced on a fortnightly basis until 8 weeks following injury when physiotherapy is commenced. All patients were followed up for a minimum of 2 years. Primary outcome was incidence of re-rupture, other outcomes included subjective assessment via patient questionnaire of function, complications, and satisfaction, and an objective assessment of ankle strength by specialist physiotherapist.

3. Results

A total of 1044 patients presented during the study period, of which 69 were excluded due to misdiagnosis, a further 26 who were treated operatively, and 3 who had already had operative treatment overseas. Leaving 945 patients (949 ruptures), comprising 690 men and 255 women, average age 49 years (12-86) treated according to the protocol. Re-rupture occurred in 25 patients (2.5%) of acute presentations (<2 weeks from injury) and in 2 patients (2.7%) of delayed presentation. There was no statistically significant difference in the rate of re-rupture when comparing those patients who regularly played sport pre-injury versus those that didn't, 2.8% and 2.9% respectively.

6 patients (0.6%) had a subjectively poor functional outcome and therefore underwent subsequent tendon repair/shortening. Other complications including paraesthesia, pain, ulcers, DVT/PE occurred in a small percentage of patients (Between 1-2%). All patients returned to work within three months of completing functional bracing, and all patients returned to previous level of sporting activity. 99.4% reported good/excellent subjective assessment scores.

4. Conclusions

The authors argue that these results demonstrate successful implementation of a non-operative approach with functional bracing, with very few complications.

Critique

This retrospective review presents a compelling argument for the non-operative treatment of acute tendo Achilles ruptures. However, throughout the article information is presented to the reader in a non-standard manner which is undesirable. Including results presented in the methodology section, and discussion in the results section. Furthermore several assumptions are made by the authors which are not qualified, including "tendon ends always approximate well on palpation when there has been no delay in presentation".

Strengths

- Single centre, single surgeon – Protocol compliance is likely to be high
- Large number of patients
- 2 year follow up
- Very low levels of complications
- Very low re-rupture rates
- Excellent rate of return to function
- Validates the argument for non-operative treatment

Methodological Concerns

- No validated objective assessment of functional outcomes

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- Treatment protocol could be more clearly defined
- Assumptions made on diagnosis of primary rupture and suitability for functional bracing
- Unclear how complications (including re-rupture) were diagnosed

Further relevant discussion on this topic has been highlighted by the JBJS Br Foot & Ankle Clinical lead in his article (<http://www.boneandjoint.org.uk/content/should-we-all-be-treating-acute-tendo-achillis-ruptures-conservatively-now>). He argues that several of the recent articles favouring a non-operative approach to tendo Achilles rupture are underpowered to detect a significant difference in rate of re-rupture, and that a larger RCT of approximately 2000 patients would be required to test the hypothesis.

Paper 2 - Reviewer: Mr S Harrison

Summary

1. Purpose

- To assess whether surgical treatment of acute tendo Achilles rupture offered superior functional outcome over non-operative management.
- To assess whether operative treatment permitted improved or faster muscle function recovery.

2. Methods

- Prospective study of all acute ruptures of tendo Achilles presenting to their department
- Exclusion criteria: Older than 60 years, Delayed presentation >10 days from injury, Systemic disease (including rheumatoid arthritis, chronic renal failure, steroid or chemotherapy use)
- Randomisation through blind envelope selection (Operative Vs Non-operative)
- Operation carried out within 7 days of presentation by consultant orthopaedic surgeon (one of four foot and ankle specialists) or by senior trainee under supervision

Operative Regimen:

- Posteromedial incision
- Core Kessler stitch with double-stranded PDS suture apposed tendon ends
- Casted post operatively: Full equinus (four weeks), Semi-equinus (two weeks), then allowed to weight bear

Non-operative Regimen:

- Full equinus cast (four weeks), Semi-equinus (four weeks), neutral (two weeks), then allowed to partial weight bear

Post treatment physiotherapy:

- Weeks 1 and 2 - increasing range of movement, non-weight bearing dorsiflexion exercises
- Weeks 2 to 6 - ankle range of movement emphasised, calf strengthening, proprioception exercises.
- Weeks 6 to 6 months - increased functional activity, calf strengthening

- Data collected by single observer on presentation, then at 3, 4, 6 and 12 months.

- Clinical outcome measures:

- Muscle dynamometry
- Complications

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- Functional outcome (Short Musculoskeletal Function Assessment questionnaire (SMFA) and Range of motion measured using a goniometer)
 - Time to return to work, sport and driving
- To identify a 10% difference in muscle function, power study identified 80 patients required

3. Results

- 80 patients included in study (37 in surgical group, 39 in non-operative group completed 12 month follow up)
- Groups were well matched for age and gender
- 76 patients either declined participation or were excluded on account of late presentation, aged over 60, partial rupture only, bilateral rupture, significant systemic disease, or incomplete follow-up.
- Re-rupture: Operative 5.4% vs. Non-operative 10.3% (not statistically significant)
- Infection: Operative 8.1% vs. Non-operative 0% (not statistically significant)
- DVT: Operative 0% vs. Non-operative 5% (not statistically significant)
- Functional outcome:
 - Ankle range of motion better at 26 weeks in operative group (statistically significant)
 - No statistically significant difference in plantar or dorsiflexion between groups at any point
- Muscle recovery:
 - At 12 weeks peak torque difference was better in the non-operative group (statistically significant)
 - No statistical significance between groups for plantarflexion or dorsiflexion recovery at any point
- SMFA: Statistically significantly better scores in operative group at three months ($p < 0.03$), but equalised by 1 year.
- Return to Work: Mean 12 week return to work in both groups (not statistically significant)
- Return to Driving: 12 weeks in operative group vs. 14 week in non-operative group (not statistically significant)

4. Conclusions

- Operative treatment does not offer statistically significant benefit between the two treatment modalities in the long term
- The main benefits associated with surgery may result in less time being immobilised in plaster but the risks of surgery may complicate outcomes

Critique

This paper aims to highlight whether operative treatment or non-operative treatment is better for the treatment of acute tendo Achilles rupture. The authors assessed muscle function recovery.

Strengths

- Inclusion and exclusion criteria identified
- Identified randomised
- Identified patient pathway in trial
- Prospective, randomised controlled trial
- Functional scoring used

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- Statistical tests identified
- Results comparable with existing studies

Methodological Concerns

- Operation not performed by a single surgeon
- Physiotherapy not performed by a single physiotherapist
- The study is not powered significantly
- Analysis is made at each time interval, this may dilute the result
- The main outcome measure is function, not re-rupture rate as state
- Different rehabilitation regimes in each group – length of time in cast varied between group
- Accelerated rehabilitation regimes not used in both groups
- The computer dynamometry is not disease or activity specific
- Elderly patients (up to 60 years of age) may have a degree of degeneration of their tendo Achilles. No mention of tendinopathy in these patients mentioned.

Paper 3 - Reviewer: Mr B Haughton

Summary

1. Purpose

To compare the outcomes of patients with acute Achilles tendon rupture treated with either operative repair and accelerated functional rehabilitation or accelerate functional rehabilitation alone.

2. Methods

144 patients randomly allocated to two groups. Both groups underwent a prescribed accelerated rehabilitation protocol. One group also had operative repair. Primary outcome measure was re-rupture rate. The authors also compared isokinetic strength, Leppilahti score, range of motion, and calf circumference with 2 years of follow up.

3. Results

There were 2 re-ruptures in the operative group and 3 in the non-operative group. There was no clinically significant difference between the two groups when comparing isokinetic strength, Leppilahti score, range of motion and calf circumference. There were 13 complications reported in the operative group compared to 6 in the non-operative group. The excess complications in the operative group were mostly ascribed to soft-tissue related problems.

4. Conclusions

Operative treatment of acute Achilles tendon rupture does not offer any clinically significant benefit over accelerated functional rehabilitation alone and is associated with a higher complication rate.

Critique

Strengths

- Paper well written and easy to read

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- Aims are very clearly stated
- Conclusions are valid and are placed in a context of the study's limitations

Methodological Concerns

- Strict inclusion criteria
- Power calculations based on previous meta-analysis with rates of re-rupture of 2.5% and 13% for patients treated operatively and non-operatively respectively. However, actual re-rupture rates in this study were markedly lower for those treated non-operatively (4%). Therefore sample size is small (which the authors accept).