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Accelerated rehabilitation following Achilles tendon repair after acute rupture – Development of an evidence-based treatment protocol

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ABSTRACT

The acute rupture of the Achilles tendon is a protracted injury. Surgery is only the beginning of a long rehabilitation period. Therefore, the rehabilitation protocol is an integral aspect to restore the pre-injury activity level. Despite several trials available comparing different treatment regimes, there is still no consensus regarding the optimal protocol. Consequently, the aim of our study was to systematically search the evidence available and define a precise rehabilitation programme after operative repair of acute Achilles tendon rupture based on the trials with the highest level of evidence.

We performed a systematic literature search in Medline, Embase and Cochrane library. We identified twelve randomized controlled trials comparing different treatment regimes after operative repair of the Achilles tendon.

Five trials compared full to non weight bearing, all applying immobilization in equinus. Immediate full weight bearing led to significant higher patient satisfaction, earlier ambulation and return to pre-injury activity. Four trials compared early ankle mobilization to immobilization. All trials found mobilization to be superior as it shortens time to return to work and sports significantly. Three trials compared the combination of full weight bearing and early ankle mobilization to immobilization. This combination was most beneficial. Patients showed significantly higher satisfaction, less use of rehabilitation resources, earlier return to pre-injury activities and further demonstrated significantly increased calf muscle strength, reduced atrophy and tendon elongation. No study found an increased rerupture rate for the more progressive treatment.

In conclusion, the rehabilitation protocol after Achilles tendon repair should allow immediate full weight bearing. After the second postoperative week controlled ankle mobilization by free plantar flexion and limited dorsiflexion at 0° should be applied.

Introduction

The acute rupture of the Achilles tendon (ATR) is a protracted injury as the operative repair only marks the beginning of a long recovery period. Postsurgical rehabilitation is an important aspect in the treatment of these injuries aiming for an early restoration of the pre-injury activity level, without increasing the risk of rerupture or tendon elongation. By now, early weight bearing is widely accepted [1,2]. Currently, there is increasing evidence for even more progressive rehabilitation regimes [3]. Despite the increasing number of RCTs and reviews available, there is still no consensus regarding the most preferable protocol. Furthermore, the evidence available is regularly neglected [4]. In 2010, the American Academy of Orthopaedic Surgeons published the only clinical guidelines, recommending immediate postoperative weight bearing immobilizing the ankle in an orthesis [5]. Since then, two reviews analyzed the current evidence regarding the rehabilitation after ATR [6,7]. Although documenting the superiority of early weight bearing and early ankle mobilization, both come short to suggest a clear treatment recommendation. Consequently, the aim of our study was to systematically search the evidence available and define a precise rehabilitation programme after operative repair of acute ATR based on the trials with the highest level of evidence.

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Materials and methods

Search strategy

The database search was performed on September 30th 2013 in Medline, Embase and the Cochrane Collaboration library. Medline and Embase were searched from inception to September 2013 using the text words "Achilles", "tendon", "rupture" for English and German articles. The terms were combined using a Boolean AND operator. The Cochrane library was searched for the text word "Achilles tendon". Two authors (MB, HP) independently reviewed all citations with regard to the inclusion criteria described below. First all titles were reviewed and studies not meeting the inclusion criteria were excluded. Abstracts of the remaining studies were independently reviewed accordingly. Studies missing the defined inclusion criteria were again excluded. Thereafter, the full text of all remaining articles was retrieved and also independently reviewed. Again, only articles meeting the PICOS criteria were selected. Furthermore, the reference lists of all eligible full text articles were hand-searched to ensure that no relevant studies were missed after the database search. Differences were resolved by discussion. The detailed results of the literature search are shown in Fig. 1.

Eligibility criteria

Only studies evaluating acute, isolated ruptures of the Achilles tendon were included. An acute rupture was defined to be less than 14 days old [8]. In order to guarantee the highest comparability only studies using the same operative intervention were selected. Open surgery was defined as intervention, as the trials with the highest level of evidence available, all applied this procedure and no RCT used percutaneous surgery. We identified all trials comparing different rehabilitation protocols following surgical Achilles tendon repair. The outcome parameters had to include patient satisfaction, functional assessments, time to return to work/sports, tendon elongation, reruptures or complications. Only studies with the highest level of evidence were selected. The level of evidence was assessed independently by two of the authors in accordance to the level-of-evidence rating system introduced by Wright et al. [9] Disagreements were resolved by discussion.

Participants:	Patients with an acute, isolated Achilles tendon rupture
Intervention:	Open operative suture of the Achilles tendon
Comparison:	Different postoperative treatment protocols
Outcomes:	Patient satisfaction, functional assessment, time to return to work/sports, tendon elongation, rerupture, complication
Study design:	Randomized controlled trial

Quality assessment

In order to rank the included studies due to their methodological quality a modified version of the original Coleman Methodology

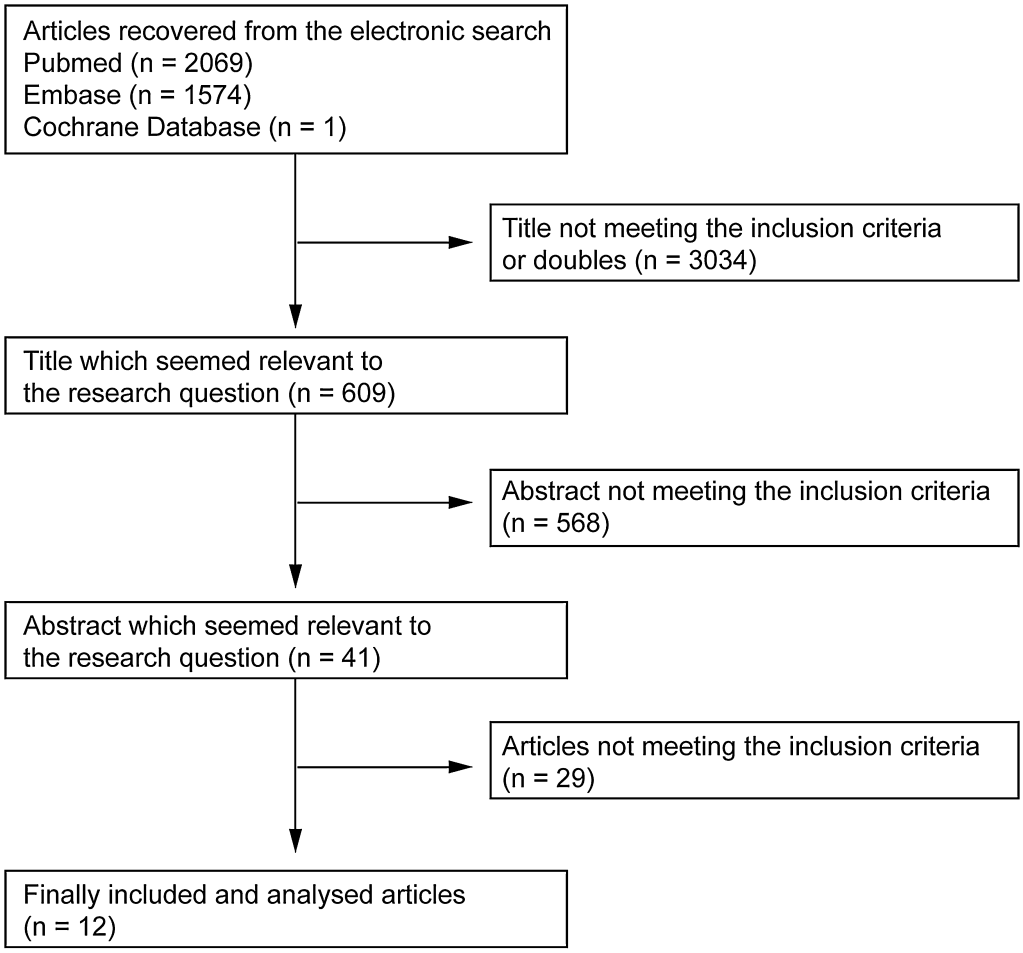

Fig. 1. Flow chart of study selection.