Effectiveness of physical therapy for Achilles tendinopathy: an evidence based review of eccentric exercises

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CRD summary
This review assessed the effectiveness of eccentric exercise training for patients with Achilles tendinopathy. The authors concluded that eccentric exercise training resulted in modest but significant post-treatment clinical benefits. Owing to the uncertain quality of the included studies and the poor reporting of some of the review processes, these conclusions should be interpreted with caution.

Authors' objectives
To determine whether eccentric exercise training is effective in the treatment of patients with Achilles tendinopathy.

Searching
The authors searched the following internet sources and websites: PubMed, the Cochrane Library, PEDro, Evidence-Based Medicine and Hooked on Evidence. They also searched the reference lists of key research studies. The searches were restricted to clinical studies published within the last 10 years and basic science research published within the last 15 years. The authors did not state whether any language restrictions were applied.

Study selection
Study designs of evaluations included in the review
Clinical studies of any design and basic science research were eligible for inclusion in the review.

Specific interventions included in the review
Studies that assessed eccentric exercise training, a physical therapy intervention, were eligible for inclusion. The patients in the included studies were given eccentric exercises, eccentric overload, eccentric/concentric stretching, or eccentric exercises and a splint for 12 weeks' duration. The control interventions, where present, were rest/surgery, exercise without pain, night splint and concentric exercises.

Participants included in the review
Studies of patients with Achilles tendinopathy were eligible for inclusion. Where reported, the studies included patients who were minimally active, were recreational athletes, or were active in competitive sports. In the included studies, the average age of the patients ranged from 44 to 51 years and the duration of their symptoms ranged from over 4 weeks to 20 years, where reported.

Outcomes assessed in the review
The outcomes of interest were pain reduction, return to normal activity in the short term, rehabilitation of the tendon, and prevention of re-injury in the long term. The included studies assessed concentric plantar flexion, pain, pain at rest, pain with activity, pain on palpation, toe raise, tendon thickness and tendon volume. Pain was assessed using a visual analogue scale or by scoring from 1 to 6 or 0 to 100. Tendon thickness was measured using ultrasound, while tendon volume was measured using magnetic resonance imaging.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The authors did not state that they assessed validity.
Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Where available, data were reported as the baseline mean score, end of study mean score, change score (treatment effect), absolute benefit and relative difference in change from baseline. The change score was the difference between the end of study mean and baseline mean, divided by the standard deviation of the difference score. The absolute benefit was the change score of the intervention group minus the change score of the control group.

Methods of synthesis
How were the studies combined?
The studies were described individually and the results tabulated. The relative differences in pain score change from baseline for 4 studies were presented in a graph.

How were differences between studies investigated?
Differences between the studies were discussed.

Results of the review
Seven studies were included in the review: 2 randomised controlled trials (RCTs; n=84), 2 controlled clinical trials (n=74) and 3 uncontrolled cohort studies (n=158).

Patients who were given eccentric exercises had a greater increase in concentric plantar flexion and a greater decrease in pain at rest than those allocated rest prior to surgery (1 study). Patients who were given 'overload' eccentric exercises had a greater decrease in pain on palpation and were more satisfied with their performance ability than those allocated exercise without pain; however, there was very little difference in toe raise between the two groups (1 study). Patients who were given eccentric exercises had a greater pain reduction, and a higher proportion of patients returned to regular athletic activity than those given eccentric exercises plus a night splint or a night splint alone (1 study). Insufficient data were available to compare the intervention group with the control group in 1 study, but the group given eccentric exercises had reduced pain at the end of the study compared with the baseline measurement and a higher proportion of those in the eccentric exercise group were satisfied than those in the control group (concentric exercise).

The uncontrolled studies found that, compared with the baseline measurement, patients given eccentric exercises had less pain (2 studies) and a decrease in tendon thickness (1 study) and volume (1 study) at the end of the study.

Authors’ conclusions
Eccentric exercise training resulted in modest but significant post-treatment clinical benefits, but there was insufficient evidence to predict the long-term effects of eccentric exercise training for patients with Achilles tendinopathy.

CRD commentary
The review question was clear in terms of the intervention, participants and outcomes of interest. The authors were not restrictive in terms of study design. The authors searched a range of sources via the Internet, although these might not have been the most appropriate sources; it was not stated whether any language restrictions were applied. Unpublished data were not sought, thus increasing the potential for publication bias. The processes used for selecting studies and extracting the data were not reported, therefore the potential for reviewer error or bias cannot be assessed. The quality of the included studies did not appear to have been systematically assessed. The included studies had small sample sizes and generally had a short duration of follow-up. Those that had longer follow-up durations suffered from high drop-out rates, therefore the authors tabulated scores at the 12-week follow-up for all studies.

Adequate details of the included studies were presented. Appropriate measures of effect were calculated. The narrative synthesis was appropriate given the differences in study design, interventions and outcome measures. The authors’ conclusions appear to follow from the evidence presented. However, owing to the uncertain quality of the included
studies and the lack of reporting of some of the review processes, the conclusions should be interpreted with caution.

**Implications of the review for practice and research**

**Practice:** The authors stated that eccentric exercise paired with biomedical training techniques should be integrated into treatment guidelines for patients with Achilles tendonitis.

**Research:** The authors stated that RCTs with large sample sizes and long-term follow-up are required to assess interventions for Achilles tendinopathy. Such studies would benefit from blinding data collectors and using magnetic resonance or ultrasonography imaging to collect objective structural data, as well as functional outcomes and subjective assessments of pain. Studies should also assess the impact of eccentric exercises of different speeds, intensity and duration, as well as assessing why eccentric exercises are effective for the treatment of degenerative Achilles tendinosis. The authors also stated that it may be useful to study the differences in tendon response to exercise in cases where there is a known predilection to connective tissue, muscle and vascular disturbances, and to determine if changes in endocrine function would alter the treatment effect of eccentric exercises.

**Bibliographic details**

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