Chronic Effects of Resistance Training on Mechanical, Morphological, and Clinical Outcomes in Subjects with Patellar and Achilles Tendinopathy: A Scoping Review.

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Summary

Tendinopathy is a common sport injury with a high prevalence in sports involving jumping (i.e. basketball, volleyball, handball, etc.). Its etiology remains unclear, although mechanical overuse has a large impact, leading to incorrect healing and recovery. Eccentric training is the gold-standard method in tendinopathy rehabilitation, but research in the past decade has shown that other types of interventions are having similar and even better effects on tendinous tissue, with less demanding and painful approach. This scoping review shows the different benefits of heavy slow resistance training and eccentric training on the properties of the patellar and Achilles tendon.

Introduction

Tendinopathy is a disabling and painful condition in athletes, with a prevalence of up to 45% in specific sports like running, basketball and volleyball [1]. One of its predominant causes is mechanical overuse of the tendon tissue, which can result in repetitive strain beyond physiological limits, resulting in a degenerated and weakened tendon [2].
Eccentric training has been the gold-standard of treatment in tendinopathies; however, it is more mechanically demanding and pain-provoking (delayed onset muscle soreness, DOMS), Studies have shown that, in a system already sensitized due to chronic pain and the presence of pain-enhancing substances, the addition of acute pain through DOMS can interfere with cortical excitability, and alter pain-related corticomotor adaptations [3].
This study aims to investigates and compare the different outcomes of chronic eccentric training (ECC) and heavy slow resistance training (HSRT) in functional, structural, morphological, and clinical outcomes in participants with patellar and Achilles tendinopathy.

Methods

An electronic search was conducted in three databases (Pubmed, Scopus, and Web of Science). In total, 5460 studies were identified. After removing duplicates (n=1862) the remaining articles were screened by two researchers by title and, if necessary, by abstract (Figure 1).

After extracting the data from the included studies, pain (VAS), tendon thickness, tendon stiffness, and tendon cross-sectional area (CSA) were assessed. Values are expressed as weighted mean changes (in percentage) and pooled standard deviation.

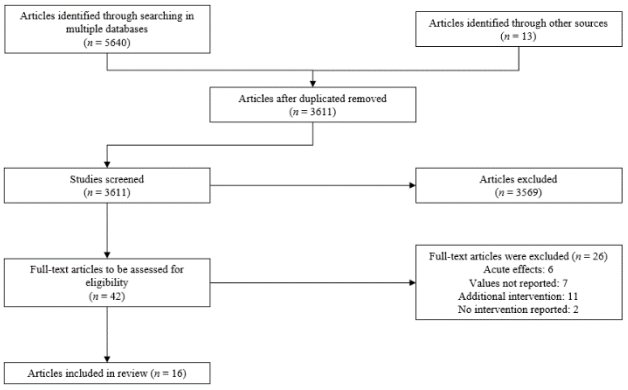

Figure 1: Flow chart of the screening process

Results and Discussion

After a thorough screening process, 16 studies were included in the review. HSRT resulted in a larger reduction in pain (56.16% ± 0.06 vs. 41.74% for ECC), greater increases in tendon stiffness (4.11% ± 0. 02 vs. 1.57% for ECC), and greater reduction in tendon thickness (5.45% ± 0.07 vs. 0.2% for ECC), while ECC training showed a greater increment in tendon CSA (7.70% ± 0.09 vs. 3.83% for HSRT) along with a higher decrease in tendon's Young modulus (9.76% ± 0.60 vs. 2.8% for HSRT).

Conclusions

Our results are in line with literature on structural properties of healthy tendons, showing a positive response to resistance training with an increase in stiffness [4]. Although both protocols reduced pain significantly, ECC training does not seem to be the only and best method of rehabilitation for tendinopathies. Heavy sloe resistance training seems to be more beneficial when targeting the mechanical properties of the tendon, which are proposed to be one of the main risk factors in developing tendinopathy in the first place[2].

References

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