Exercise therapy for the treatment of tendinopathies: a scoping review protocol.

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2021

Title

Exercise therapy for the treatment of tendinopathies: A scoping review

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30 Acknowledgements - none

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Review title

Exercise therapy for the treatment of tendinopathies: A scoping review protocol

Abstract

Objective: To provide a map of exercise interventions and outcomes that have been reported for the treatment of any tendinopathy.

Introduction: Tendinopathy is a common condition that affects athletic and non-athletic populations. Exercise is the mainstay of conservative management of tendinopathy, and a range of different exercise types are recommended. There is a significant body of literature on exercise for tendinopathy, but to date no scoping review has provided a clear map of interventions used and outcomes reported in the literature.

Inclusion criteria: We will include people of any age or gender with a diagnosis of tendinopathy of any severity or duration at any anatomical location. We will exclude full-thickness/massive tears, and plantar fasciitis. The exercise therapy may take place at any location including hospital, community, or in people's homes, and may be supervised or unsupervised. We will include systematic reviews, quantitative, qualitative and mixed-methods studies conducted in any developed nation.

Methods: We will search Medline, CINAHL, AMED, EMBase, SPORTDiscus, Cochrane (controlled trials; systematic reviews), JBI Evidence Synthesis, Epistemonikos, four trial registries, and six grey literature databases. We will use Scopus to search for cited/citing articles from included studies and will perform hand-searching where relevant. We will include literature from 1998 – 2020 in any language for which we can access translation. Studies will be screened by two independent reviewers at title/abstract and full-text screening stages; a third reviewer will resolve conflicts. Data will be extracted onto a bespoke charting form and will be presented as figure/tables with accompanying narrative.

Keywords: Exercise; Tendinopathy; Scoping review; Rehabilitation; Musculoskeletal

Abstract word count: 249

Total manuscript word count: 2,084

Introduction

Tendinopathy is a common condition affecting athletic and non-athletic populations. Tendinopathy is commonly regarded as degenerative changes which are observed within a tendon[1] and is characterized by a combination of pain,[1] impaired movement,[2] impaired performance/function [3] and requires a long period of recovery.[2,4-5] Tendinopathy can theoretically affect any of the 600+ muscle-tendon units in the body,[6] however, it is most commonly reported in the Achilles, patellar, lateral elbow, rotator cuff, and hip tendons.[6]

The Global Burden of Disease 2010 study highlighted that "other musculoskeletal" conditions, including disorders of the synovium and tendon, are common, accounting for 28.3 million years lived with disability, making them one of the world's top 10 contributors to global disability burden.[7] Tendinopathy is common not only in athletic populations but also in the general population. For example, a study of prevalence and incidence of lower extremity tendinopathy in a Dutch general population reported rates of 11.83 and 10.52 per 1000 person-years, respectively.[8] Tendinopathies can affect children, adolescents, and adults of all ages, and many tendinopathies have a chronic or recurrent course.[6] Costs to the individual, the health service and economy (due to absenteeism and loss of productivity) are therefore substantial, and identifying effective interventions is a priority. Musculoskeletal conditions, including tendinopathies, have significant impact on primary and secondary healthcare utilization.[9] By identifying effective interventions across the range of tendinopathies, General Practitioners/Physicians and other first-contact practitioners (e.g. physiotherapists), managing the condition can be confident in delivering effective evidence-based practice. With an ageing population, and increasing pressure and demands on healthcare services, the need for clear guidance for evidence-based practice has never been more important.

Exercise therapy is the mainstay of conservative management of tendinopathy and has focused largely on eccentric strengthening techniques to date.[10] However, other exercise types, including isotonic and heavy slow resistance exercise have also been recommended for some tendinopathies (e.g. patellar[11]). Exercise may be used in isolation or as an adjunct to other interventions, such as extracorporeal shockwave,[12] laser therapy,[13] or following regenerative or orthobiologic procedures such as prolotherapy, platelet-rich plasma or stem-cell treatments.[14] Due to the heterogeneity of tendinopathy (anatomical location, duration), the range of people it can affect (age, gender, activity level, other risk factors and comorbidities) and the variation in exercise approaches (type, dosage, setting) a broad and comprehensive evidence synthesis is essential as a first step to inform future clinical practice.

Prior to conducting a review to establish the effectiveness of exercise for tendinopathy, a logical step would be to map the evidence (such as a scoping review) on exercise for tendinopathy to enable decisions to be made on appropriate syntheses to follow. In addition, a scoping review would also be useful to map which types of exercise for tendinopathies have been synthesized to inform subsequent

review of reviews. Previous reviews have focused on specific tendinopathies, regions of the body or exercise sub-types but there is no scoping review to date that has mapped the evidence across all tendinopathies.[15,16]

This scoping review will map existing literature and identify important subgroups and outcome measures to inform subsequent contingent systematic reviews and primary research. A preliminary search of PROSPERO, MEDLINE, the Cochrane Database of Systematic Reviews and JBI Evidence Synthesis was conducted and while systematic reviews are ongoing on specific tendinopathies, no scoping reviews (published or in progress) or systematic reviews mapping this topic were identified. The aim of this scoping review is therefore to map the existing evidence on exercise therapy for the treatment of tendinopathies.

Review question(s)

1. What exercise interventions have been reported in the literature and for which tendinopathies?

2. What outcomes have been reported in studies investigating exercise interventions for tendinopathies?

Inclusion criteria

Participants

This review will include people of any age or gender with a diagnosis of tendinopathy of any severity or duration and at any anatomical location. The term “tendinopathy” has been in widespread use for some time. Some literature may use “tendinitis” or “tendinosis” to describe participants’ tendon pathology as the precise aetiology of tendinopathy remains undetermined.[6] Therefore, we will include all the above terms, as long as the population has a tendon complaint presenting with one or more of pain, swelling and impaired function or performance. Diagnostic criteria vary across tendinopathy studies with there being a need to vary inclusion criteria by tendon site, especially for the shoulder and hip areas where there is a continuum of rotator cuff or gluteal tendinopathy extending through to full tear. Studies that include participants with tendinopathy in the absence of a tear, or a small tear will be included. Large, full-thickness or massive tears will be excluded, as will groups where the tear size cannot be determined as these require different management approaches.[17]

We will accept trial authors’ diagnoses where a clearly verifiable group of clinical features is reported including; pathognomonic location of pain; a symptom altering response to applied load and/or stretch, with there being a specific test for most tendinopathies; strategies to rule out differential diagnoses; ultrasound or magnetic resonance imaging confirmation of structural change. Studies with mixed groups will have data included where there is clear reporting of the tendinopathic group, or they make up > 90% of the investigated cohort.[18]

Our definition of tendinopathy therefore includes tendinopathies such as PTTD (posterior tibial tendon dysfunction), tibialis posterior tendinopathy, peroneal tendinopathy, and GTPS (greater trochanteric pain syndrome). However, it excludes plantar heel pain as this condition may respond differently to exercise therapy and could potentially confound the review findings.

Concept

The health technology being assessed is exercise therapy (any type or format) for the treatment of any tendinopathy. We will therefore include any type of exercise therapy, including but not limited to eccentric, concentric, heavy slow resistance, stretching, cardiovascular, whole-body or combinations of two or more of these exercise types. The exercise therapy may be used as a first or second-line intervention for tendinopathy and may be delivered in isolation or with adjunct therapies. Studies incorporating exercise post-surgery will be excluded as this review is focused on conservative management of tendinopathy. Exercise therapy may be delivered in a range of settings (e.g. primary care, secondary care, community, people's homes) by a range of health or exercise professionals (e.g. physiotherapists, strength & conditioning coaches, personal trainers) or support workers, and may be supervised or unsupervised (i.e. self-management).

Context

The context will include primary care, secondary care or community locations in any developed nation (defined as the top 62 countries in the Human Development Index),[19] in order for the findings to be relevant to the UK context, in which this scoping review is being conducted as part of a wider study on exercise therapy for tendinopathy.

Types of sources

We will include a broad range of study designs in order to produce a comprehensive map and to inform the contingent reviews that are planned to follow from this scoping review. We will include: (i) systematic reviews, (ii) quantitative studies including randomized controlled trials and quasi-experimental studies; (iii) mixed-methods studies (i.e. studies with quantitative and qualitative components), observational (cross-sectional survey) and qualitative studies. For each article located in databases and grey literature, we will conduct a search of cited and citing articles using Scopus and hand searching where necessary.

Methods

The proposed scoping review will be conducted in accordance with the Joanna Briggs Institute methodology for scoping reviews.[20] A protocol has been registered on Open Science Framework.[21]

Search strategy

A 3-step search strategy will be adopted by the review team. Firstly, a limited search of MEDLINE and CINAHL using initial keywords (MH tendinopathy OR TX tendin* OR TX tendon*) AND (MH exercise OR TX exercis*) was conducted with analysis of the text words in the titles/abstracts and those used to describe articles in order to develop a full search strategy. Secondly, the full search strategy will then be adapted to each database and applied systematically to: MEDLINE, CINAHL, AMED, EMBase, SPORTDiscus, Cochrane library (Controlled trials, Systematic reviews), JBI Evidence Synthesis, PEDRo, and Epistemonikos (a full search strategy for MEDLINE is presented in Appendix I). The following trial registries will also be searched: ClinicalTrials.gov, ISRCTN Registry, The Research Registry, EU-CTR (European Union Clinical trials Registry), ANZCTR (Australia and New Zealand Clinical trials Registry). We will also search for unpublished studies and grey literature via: Open Grey, MedNar, The New York Academy Grey Literature Report, Ethos, CORE, and Google Scholar using modified search terms. Finally, the third step will involve conducting a search of cited and citing articles using Scopus and hand-searching where necessary for each article located in step two. We will not place a language limit on searching; rather, we will include any literature where a translation is accessible via Google Translate or via international collaborations of the review team members. Searching will start from 1998 as (i) the heavy load eccentric calf-training protocol for Achilles tendinosis by Alfredsson et al [22] was published in 1998 and may be considered seminal work in the field of tendinopathy, and (ii) there has been a proliferation of research on exercise interventions for tendinopathies post 1998. Searching will be undertaken mainly using the EBSCoHost platform via the review teams' access to their institutional library, which facilitates saving searches and exporting to reference management software (Proquest®Refworks). Additional databases will be accessed using the Ovid platform via the NHS Knowledge Network.

Study selection

Proquest® Refworks will be used to manage references and remove duplicates, before importing to Covidence (Melbourne, Australia) to facilitate screening. Two levels of screening will be conducted. First all titles/abstracts will be reviewed, independently, by two members of the research team. Conflicts will be resolved by discussion or by input from a third reviewer. Full-text copies of all studies included at title/abstract screening stage will be retrieved and these will also be screened independently by two members of the research team with conflicts resolved in the same way.

Data extraction

The results will be charted to provide a summary of the evidence that address the review questions (which exercise interventions have been reported; what outcomes have been reported). A draft

charting form has been developed (Appendix II) and will be refined after trialing it with all data extractors on two to three studies to ensure all relevant results can be extracted.[20] Data to be extracted will include author(s), year of publication, where the source was published or conducted, aims/purpose, population and sample size, methodology / study design, setting, type of tendinopathy, intervention type and details, adjunct (if applicable), comparator (if applicable) and details of these, outcomes, and key findings that relate to the scoping review questions. Details of the exercise therapy intervention will include exercise type primarily identified at a first level as either flexibility, strength, aerobic or other then at a second level as specific sub-types of exercise aligned to the first level. This criterion was developed by the authors for this review due to a lack of evidence for an established exercise taxonomy. Additional exercise therapy details to be extracted will include mode of delivery, dosage, and adjunct therapies (where appropriate). Details of the population will include dimensions such as age, gender, body mass index, athleticism, health behaviors (e.g. smoking), co-morbidities (e.g. diabetes) and medication, where reported. The population details will assist in deciding on relevant subgroups to investigate in the subsequent systematic reviews which will be informed by the current scoping review. Once the charting form has been piloted and refined as appropriate, data extraction will be conducted by one reviewer, with independent data extraction by a second reviewer for at least 10% of studies. Authors of studies will be contacted in the event of missing data. In keeping with guidance on conducting scoping reviews,[20] critical appraisal will not be conducted.

Data presentation

The results will be presented as a series of figures and tables, i.e. a map of the exercise therapies and outcome measures reported in the literature, with accompanying narrative. The visual data presentation will include tables (including characteristics of included sources of evidence) and figures to display frequencies and categories (such as types of exercise for which types of tendinopathy and types of outcomes that are reported). Additional data presentation styles will also be considered including network diagrams and heat maps to fully present the results of this review. The exercise intervention components will also be presented as a visual map against the template for intervention description and replication (TIDieR) checklist to identify consistency in reporting of exercise interventions across included sources of evidence.[23] The map will also indicate gaps in the evidence base and inform the planned subsequent systematic reviews.

Acknowledgments

Funding

This project is funded by the National Institute for Health Research (NIHR) [Health Technology

Assessment (HTA) 129388 Exercise therapy for the treatment of tendinopathies]. The views expressed are those of the authors and not necessarily those of the NIHR or the Department of Health and Social Care.

Conflicts of interest

The authors declare no conflict of interest.

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Appendix I: Search strategy

MEDLINE (EBSCoHost)

Search conducted on 27 April, 2020

Search	Query	Records retrieved
#1	MH exercise OR AB exercis* OR MH "isometric contraction" OR MH rehabilitation OR TX eccentric OR TX concentric OR TX "heavy slow resistance" OR TX isokinetic	362,722
#2	MH tendinopathy OR MH "shoulder injuries" OR MH tendons OR MH "tendon injuries" OR TX tendin* OR TX tendon* OR MH bursitis OR AB bursitis OR MH "posterior tibial tendon dysfunction" OR MH "shoulder impingement syndrome" OR AB "greater trochanteric pain syndrome"	96,490
#3	#1 AND #2	4,363
Limited to 1998 to present		

Appendix II: Data extraction instrument

Draft data extraction chart:

Author, Year, Country	Study design	Aim/Purpose	Population, Sample size	tendinopathy type	Exercise therapy type	Adjunct	comparator	Outcomes (Domain & Tool)	Key findings