TENDINOPATHY RESEARCH UPDATE - April 2013

Contents

NORMAL TENDON & PATHOLOGY

Eur J Appl Physiol. 2013 Apr 16. [Epub ahead of print]

No inflammatory gene-expression response to acute exercise in human Achilles tendinopathy.

Pingel J, Fredberg U, Mikkelsen LR, Schjerling P, Heinemeier KM, Kjaer M, Harisson A, Langberg H.

Abstract

Although histology data favour the view of a degenerative nature of tendinopathy, indirect support for inflammatory reactions to loading in affected tendons exists. The purpose of the present study was to elucidate whether inflammatory signalling responses after acute mechanical loading were more pronounced in tendinopathic versus healthy regions of human tendon and if treatment with non-steroidal anti-inflammatory medications (NSAID's) reduces this response. Twenty-seven tendinopathy patients (>6 months) were randomly assigned to a placebo (n = 14) or NSAID (Ibumetin NYCOMED GmbH Plant Oranienburg Germany (600 mg) × 3/day/1 week) group (n = 13) in a double-blinded-fashion. Tendon biopsies were taken from the painful and a healthy region of the same tendon 2 h after 1 h running. Gene-expression of several targets was analysed in the sampled Achilles tendon biopsies. The mRNA for TGF-β, collagen-I and collagen-III were significantly higher expressed, and decorin, CTGF, IL-6 and IL-10 were significantly lower expressed in the tendinopathic versus healthy tendon area. Only IL-10 was lower in expression in experiments with NSAID

administration, while all other determined parameters were unaffected by NSAID. All ultrasonographic outcomes were unchanged in response to acute exercise and not influenced by NSAID. The signalling for collagen and TGF-beta was upregulated after acute loading in tendinopathic tendon. In contrast to the hypothesis, inflammatory signalling was not exaggerated in tendinopathic tendon 2 h after acute mechanical loading.

AETIOLOGY

Rheumatology (Oxford). 2013 Apr;52(4):599-608. doi: 10.1093/rheumatology/kes395. Epub 2013 Jan 12.

Occurrence of tendon pathologies in metabolic disorders.

Abate M, Schiavone C, Salini V, Andia I.

Abstract

This article reviews the pathogenetic role of metabolic disorders, which are of paramount relevance to the progression of tendon damage. In diabetes, the prevalence of rheumatological diseases is high, mainly because of the deleterious effects of advanced glycation end products that deteriorate the biological and mechanical functions of tendons and ligaments. In heterozygous familial hypercholesterolaemia, most patients develop Achilles xanthomatosis, a marker of high risk for cardiovascular disease caused by cholesterol deposition in the tendons. Tendon degeneration has also been observed in non-familial hypercholesterolaemia. Monosodium urate crystal deposition in soft tissues is a hallmark of chronic gouty arthritis. In this group of diseases, the mobilization of cholesterol and uric acid crystals is presumably followed by low-grade inflammation, which is responsible for tendon degeneration. Adiposity may contribute to tendon disorders via two different mechanisms: increased weight on the load-bearing tendons and systemic dysmetabolic factors that trigger subclinical persistent inflammation. Finally, tendon abnormalities have been observed in some rare congenital metabolism disorders such as alkaptonuria.

DIAGNOSIS, ASSESSMENT

IMAGING

Scand J Med Sci Sports. 2013 Mar;23(2):e81-8. doi: 10.1111/sms.12021. Epub 2012 Dec 17.

Patellar tendon morphology in volleyball athletes with and without patellar tendinopathy.

Kulig K, Landel R, Chang YJ, Hannanvash N, Reischl SF, Song P, Bashford GR.

Abstract

Appropriate management of patellar tendinopathy requires distinguishing between inflammatory and degenerative conditions, often difficult because tendon thickening can be a normal or pathological adaptation, and micromorphology is not observable on clinical imaging. The purpose of this study was to quantitatively examine patellar tendon micro- and macromorphology in volleyball athletes and relate those findings to reported symptoms. Longitudinal ultrasound images of proximal and distal patellar tendons were acquired from 84 male elitevolleyball athletes (44 symptomatic, 40 asymptomatic) and 10 asymptomatic nonathlete controls. Micromorphology was determined using two-dimensional Fast Fourier Transform analysis providing a discriminating peak spatial frequency parameter (PSF). Macromorphology (patellar tendon thickness) was measured using Image J software. All athletes regardless of symptoms had thicker proximal tendons compared to nonathletes, suggesting a normal adaptation to training loads. However, symptomatic athletes demonstrated lower PSF than asymptomatic athletes and nonathletes at the proximal tendon, suggesting greater collagen disorganization, and tendon degeneration rather than inflammation. Only symptomatic athletes had thicker distal tendons than nonathletes, but there was no difference in PSF distally. Diagnostic ultrasound enhances the understanding of the micromorphology of patellar tendons, supporting the rationale for management that remodels the degenerated tendon instead of treating inflammation.

MANAGEMENT

Am J Sports Med. 2013 Apr;41(4):795-803. doi: 10.1177/0363546513475345. Epub 2013 Feb 13.

Platelet-Rich Plasma Versus Focused Shock Waves in the Treatment of Jumper's Knee in Athletes.

Vetrano M, Castorina A, Vulpiani MC, Baldini R, Pavan A, Ferretti A.

Abstract

BACKGROUND:

Tendinopathies represent a serious challenge for orthopaedic surgeons involved in treatment of athletes.

PURPOSE:

To compare the effectiveness and safety of platelet-rich plasma (PRP) injections and focused extracorporeal shock wave therapy (ESWT) in athletes with jumper's knee.

STUDY DESIGN:

Randomized controlled trial; Level of evidence, 1.

METHODS:

Forty-six consecutive athletes with jumper's knee were selected for this study and randomized into 2 treatment groups: 2 autologous PRP injections over 2 weeks under ultrasound guidance (PRP group; n = 23), and 3 sessions of focused extracorporeal shockwave therapy (2.400 impulses at 0.17-0.25 mJ/mm(2) per session) (ESWT group; n = 23). The outcome measures were Victorian Institute of Sports Assessment-Patella (VISA-P) questionnaire, pain visual analog scale (VAS), and modified Blazina scale. A reviewer who was blinded as to the group allocation of participants performed outcome assessments before treatment and at 2, 6, and 12 months aftertreatment. Nonparametric tests were used for within-group (Friedman/Wilcoxon test) and between-group (Kruskal-Wallis/Fisher test) testing, and the significance level was set at .05.

RESULTS:

The 2 groups were homogeneous in terms of age, sex, level of sports participation, and pretreatment clinical status. Patients in both groups showed statistically significant improvement of symptoms at all follow-up assessments. The VISA-P, VAS, and modified Blazina scale scores showed no significant differences between groups at 2-month follow-up (P = .635, .360, and .339, respectively). The PRP group showed significantly better improvement than the ESWT group in VISA-P, VAS scores at 6- and 12-month follow-up, and modified Blazina scale score at 12-month follow-up (P < .05 for all).

CONCLUSION:

Therapeutic injections of PRP lead to better midterm clinical results compared with focused ESWT in the treatment ofjumper's knee in athletes.

Br J Sports Med. 2013 Apr 12. [Epub ahead of print]

Sports and exercise-related tendinopathies: a review of selected topical issues by participants of thesecond International Scientific Tendinopathy Symposium (ISTS) Vancouver 2012.

Scott A, Docking S, Vicenzino B, Alfredson H, Zwerver J, Lundgreen K, Finlay O, Pollock N, Cook JL, Fearon A, Purdam CR, Hoens A, Rees JD,Goetz TJ, Danielson P.

Abstract

In September 2010, the first International Scientific Tendinopathy Symposium (ISTS) was held in Umeå, Sweden, to establish a forum for original scientific and clinical insights in this growing field of clinical research and practice. The second ISTS was organised by the same group and held in Vancouver, Canada, in September 2012. This symposium was preceded by a round-table meeting in which theparticipants engaged in focused discussions, resulting in the following overview of tendinopathy clinical and research issues. This paper is a narrative review and summary developed during and after the second ISTS. The document is designed to highlight some key issuesraised at ISTS 2012, and to integrate them into a shared conceptual framework. It should be considered an update and a signposting document rather than a comprehensive review. The

document is developed for use by physiotherapists, physicians, athletic trainers, massage therapists and other health professionals as well as team coaches and strength/conditioning managers involved in care of sportspeople or workers with tendinopathy.

REHABILITATION & LOADING

A systematic literature review of the resistance exercises that promote maximal muscle activity of the rotator cuff in normal shoulders

Shoulder & Elbow **Volume 5**, **Issue 2**, **pages 120–135**, **April 2013**

Charlotte Ganderton, Tania Pizzari*

Abstract

Background

There are numerous resistance exercises that can be used to activate the rotator cuff. However, the optimal exercises to achieve maximal muscle activation in supraspinatus, infraspinatus, subscapularis and teres minor remain unclear. Thus, the aim of this systematic review is to identify the optimal resistance exercises for producing maximal muscle activation of the rotator cuff in normal shoulders.

Methods

A literature search was completed using six key databases - MEDLINE, EMBASE, CINAHL, PEDro, SPORTdiscus and Cochrane Library (from inception to January 2012). The search yielded 452 records using terms relating to rotator cuff, exercise, and electromyography. Eighteen papers remained after duplicates were removed and selection criteria applied. Quality assessment, data extraction and data synthesis of included papers was undertaken.

Results

Prone horizontal abduction at 90–100° with external rotation, push-up-plus, empty can and full can produced greatest activity in supraspinatus; prone horizontal abduction at 90–100° with full external rotation, standing external rotation at 0° abduction and the push-up-plus exercise produced greatest activity in infraspinatus and push-up-plus and shoulder flexion exercise in subscapularis. There was limited data for teres minor.

Discussion

Exercises to elicit maximal activity of supraspinatus, infraspinatus and subscapularis in normal shoulders were identified.

PHYSICAL THERAPIES

Effectiveness of Iontophoresis for Lateral Elbow Tendinopathy

Journal of Novel Physiotherapies

Stasinopoulos Dimitrios, Papadopoulos Konstantinos and Konstantinou Antonis

Abstract

Abstract Objective: The aim of the present review was to determine the effectiveness of iontophoresis in the management of lateral elbow tendinopathy (LET) and to provide recommendations based on this evidence. Background data: LET is a common clinical condition, and a wide array of physiotherapy treatments is used for treating LET. Methods: Randomized controlled trials (RCTs) identified by a search strategy in six databases were used in combination with reference checking. RCTs that included iontophoresis, patients with LET, and at least one of the clinically relevant outcome measures were selected. Aqualitative analysis of the selected studies was conducted using the Chalmers' technique. Results: Four RCTs fulfilled the criteria and were included in the review. Although these studies had satisfactory methodology, shortcomings were not absent; conflicting results were revealed as to the effectiveness of iontophoresis for LET management. Conclusions: Iontophoresis need not be ruled out for LET as it is a dose-response modality, and the optimal treatment dose has obviously not yet have been discovered. Further research with well-designed RCTs is needed to establish the absolute and relative effectiveness of this intervention for LET.

MEDICINES AND INJECTIONS