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Chemical and structural changes during chronic tendon pain

Submission date
05/09/2011

Recruitment status
No longer recruiting

Registration date
26/09/2011

Overall study status
Completed

Last Edited
16/06/2017

Condition category
Injury, Occupational Diseases, Poisoning

[_] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Tendons are the links between muscle and bone, and are often the site of overuse injuries. The structure of the tendon may change during muscular work and repeated training, and the response of the tendon depends on the type, length and intensity of the load. Though the tendon seems to adapt to loading, overloading seems to cause several biochemical and structural changes as well. The aim of this study is to find out if any local structural changes take place within damaged areas of Achilles tendons compared to healthy areas in the same tendon. The study also investigates which body chemicals (growth factors) are involved in the structural changes observed.

Who can participate?
Patients with chronic (long-term) tendon pain for more than 6 months

What does the study involve?
After arrival at the hospital ultrasound scans of both Achilles tendons are made, and blood samples are taken from a vein in the arm for measuring blood levels of growth factors. Two tissue samples (biopsies) from the Achilles tendon are taken with a needle. One biopsy is taken from the healthy region of the tendon, and the other biopsy is taken from a damaged region of the tendon.

What are the possible benefits and risks of participating?
The results from this study will provide important information about the growth factors involved in tissue repair, which will form the basis for a more rational treatment of damage to the tendon tissue in the future. A fee is granted for participation as compensation for lost earnings and for pain and suffering associated with the experiments. This is paid as taxable income. The probability of side effects is low, they are not serious and they will be short-lived.

Where is the study run from?
The Institute of Sports Medicine, Bispebjerg Hospital (Denmark)

When is the study starting and how long is it expected to run for?
July 2007 to September 2011.

Who is funding the study?
The Institute of Sports Medicine, Bispebjerg Hospital (Denmark)

Who is the main contact?
Dr Henning Langberg

Contact information

Type(s)
Scientific

Contact name
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Additional identifiers

Protocol serial number
N/A

Study information

Scientific Title
Local biochemical and morphological changes in human Achilles tendinopathy

Study objectives
It is hypothesized that several markers such as collagen 3 would be upregulated indicating formation of scar tissue with in the tendon along with decreased tissue quality and higher concentrations of MMP-2 and MMP-9 indicating an enhanced degradation of collagen structures in the area. Furthermore it is hypothesized that certain proteoglycans would have altered expression in the two tendon regions, e.g. a increased expression of decorin which might cause the collagen turnover to be increased also in chronic tendinopathy tendons. Additionally it is hypothesize that growth factors like fibroblast growth factor (bFGF) are decreased causing a reduced healing capacity in the injured Achilles tendons.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Scientific Ethics Committee of Copenhagen, Denmark, 18/01/2010, ref: H-1-2009-114

Study design

Randomised controlled trial

Primary study design
Interventional

Study type(s)
Treatment

Health condition(s) or problem(s) studied
Tendinopathy is a general term for chronic tendon pain. the etiology is almost unknown. Despite of inflammation like symptoms, no inflammatory cells seem to be present in the disease.

Interventions
Thirty patients with chronic Achilles tendon pain were randomly assigned to either a Structural study (n=14) or a Biochemical study (n=16) by the envelope method.

Blood samples
Blood samples taken from a vein in the arm. Construction gives seconds discomfort. There is always a very small risk of infection and for inflammation of the vein, which we have not experienced in the attempt.

Ultrasound Scanning
Ultrasound examination or sonography is widely used to display various organs and structures using ultrasonic waves. The present study uses a special doctor Audio Heads that radiates and receives ultrasonic pulses. When the sound head comes in close contact with skin, pulses are sent into the body, from which comes an echo that returns in different strengths, and through these echoes, the computer is able to display an image. Echoes into a two dimensional black and white computer image, but using a different sonography methods, you get color images, where you can see the direction of flow, speed and force of blood flow in arteries and elsewhere.

Tendon biopsies
Tendon biopsies are taken under sterile conditions from the Achilles tendon unilaterally after local anesthesia of the skin using an automatic biopsy needle (1.6 mm and length 10 mm). The wounds are closed immediately after sampling. Biopsies weigh approx. 30 mg and will immediately upon removal be stored at minus 80° C until further processing. Biopsy might result in some discomfort that lasts a few seconds during the sampling and the tendon may be slightly sore for a few days after. There may be a little bleeding that can be stopped by compression. Very rarely local numbness may occur, however, this wears off in a few months. Furthermore, there is always a theoretical risk of infection through surgery, which never occurred on this section. Biopsies will be used to determine the turnover of the extracellular matrix of tendon, as well as for identifying growth factor activation.

Intervention Type
Other

Phase
Not Applicable

Primary outcome(s)
1. Structural parameters: fibril density, fibril size, volume fraction of cells and the nucleus /cytoplasm ratio of cells were determined (measured at baseline)

2. Further gene expressions of various genes were analyzed including markers for collagen synthesis, collagen degradation, inflammation, wound healing, pain and fibrillogenesis (measured at baseline)

Key secondary outcome(s))
1. Visa A score
2. Activity levels
3. BMI calculations
4. Ultrasound and elastography analysis

Completion date
01/09/2011

Eligibility

Key inclusion criteria
Patients with chronic tendon pain for more than 6 months

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Sex
All

Key exclusion criteria
Patients who had received steroid injections less than 6 months ago

Date of first enrolment
01/07/2007

Date of final enrolment
01/09/2011

Locations

Countries of recruitment
Denmark

Study participating centre

Bispbjergbakke 23
Copenhagen
Denmark
2400

Sponsor information

Organisation
Center for Healthy Aging, University of Copenhagen [Center for Sund Aldring] (Denmark)

ROR
https://ror.org/035b05819

Funder(s)

Funder type
Other

Funder Name
Gigtforeningen

Alternative Name(s)
Danish Rheumatism Association

Funding Body Type
Government organisation

Funding Body Subtype
Associations and societies (private and public)

Location
Denmark

Funder Name
NovoNordic Foundation

Funder Name
Danish Ministry of Culture Committee for Sports Research

Funder Name
Danish Medical Research Council (ref: 22-04-0191)

Funder Name
Nordea-fonden

Alternative Name(s)
Nordea Foundation

Funding Body Type
Private sector organisation

Funding Body Subtype
Trusts, charities, foundations (both public and private)

Location
Denmark

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article	results	05/04/2012		Yes	No