

Achilles tendinopathy, biomechanics with an adapted shoe

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Primary Objective: The primary goal of this research project is to evaluate the effect of a rocker shoe on walking and running biomechanics in healthy athletes and athletes with Achilles tendinopathy. The reason for using a patient group is that...

Ethical review	Approved WMO
Status	Recruitment stopped
Health condition type	Other condition
Study type	Observational non invasive

Summary

ID

NL-OMON36411

Source

ToetsingOnline

Brief title

Achilles tendinopathy, biomechanics with an adapted shoe

Condition

- Other condition
- Tendon, ligament and cartilage disorders

Synonym

Achilles tendinopathy, Overuse Injury

Health condition

overuse injury

Research involving

Human

Sponsors and support

Primary sponsor: Universitair Medisch Centrum Groningen

Source(s) of monetary or material Support: Ministerie van OC&W

Intervention

Keyword: Achilles tendinopathy, Overuse injury, Rockerbar, Sports injury

Outcome measures

Primary outcome

External ankle dorsiflexion moment during the push off phase

Secondary outcome

Muscle activity (m. Tibialis Anterior, lateral and medial m. Gastrocnemius)

changes in response to the rockered shoe

Changes in other biomechanical parameters of gait in ankle, knee and hip (Joint angles, forces, moments, power and Spatio-temporal parameters)

Study description

Background summary

Shoe modification is one of the most common methods in prevention and treatment of overuse injuries . Rocker bars are external shoe modifications which can be prescribed for different ankle and foot pathologies.

Achilles tendinopathy is one of the most common overuse injuries, accounting for 8-15% of all injuries in athletes . Achilles tendinopathy is characterized by pain, tenderness and swelling of the Achilles tendon which is worse at the beginning of and during sporting activity Some biomechanical risk factors such as greater plantar flexion moment have been considered in developing of Achilles tendinopathy . Rockered shoes by altering the motions and moments of the ankle joint, could be a selective intervention for Achilles tendinopathy During the push off phase of gait, calf muscles make a plantar flexion motion. In response, ground reaction force (GRF) causes a dorsiflexion moment. The hypothesis is that a proximally placed rockerbar makes the arm of the external ankle moment shorter, resulting in less GRF and consequently decrease in the amount of force on the calf muscles and the Achilles tendon . In case of

changes in ankle moment due to a rocker bar, the reduced propelling force which normally is generated by calf muscles now should be compensated by other lower extremity parts such as knee or hip muscles and this might also change the angles of these joints.

It is also possible that with a proximally placed rockerbar the heel off phase of gait cycle starts earlier and consequently, we expect that the calf muscles will be active earlier as well. Besides that the amount of activity of the calf muscles should be lower if our assumption is true. This question can be studied by Electromyography (EMG).

Today, there are few of previously studies that investigate the kinetics and kinematics changes of gait with rockered shoes. In two studies only normal walking with rocker shoes has been investigated and there is only one study focused on running biomechanics with rockered shoes but the control shoes used are different brand

To our knowledge there is no study which investigates the biomechanical changes of gait in response to a rockered shoe in patients with Achilles tendinopathy and only one study has analyzed the effect of rocker bar on lower extremity muscle activity by EMG.

Study objective

Primary Objective: The primary goal of this research project is to evaluate the effect of a rockered shoe on walking and running biomechanics in healthy athletes and athletes with Achilles tendinopathy.

The reason for using a patient group is that people with Achilles tendinopathy due to pain might adapt their walking or running patterns (biomechanics). Thus, it is possible that people with Achilles tendinopathy show a different push off than normal people. It is also possible that their basic gait pattern is not changed, but that their adaptation to the proximally placed rockerbar is different from healthy people.

Primary questions:

1. Does a rockered shoe change the external dorsi flexion moment of the ankle during walking and running in healthy runners?
2. Does a rockered shoe change the external dorsi flexion moment of the ankle during walking and running in runners with Achilles tendinopathy?

Secondary Objective(s): As secondary goals, we will investigate:

- 1) Muscle activity (m. Tibialis Anterior, lateral and medial m. Gastrocnemius) changes in response to the rockered shoe
- 2) Changes in other biomechanical parameters of gait in ankle, knee and hip? (Joint angles, forces, moments, power and Spatio-temporal parameters)

Study design

Two groups of subjects will be assessed separately and a within-group

comparison will be made. One group consists of 16 healthy active athletes and one group consists of 16 athletes with Achilles tendinopathy. Subjects will undergo kinetics and kinematics measurements in a single test session of about 1 hour. In this session, they will perform at least 3 walking and 3 running trials with two pair of shoes (normal and Rockered shoes) in the Lab for Movement Analysis of the Center for Rehabilitation at the University Medical Center Groningen.

Study burden and risks

The entire study is only one session and will take about 1 hour. Each subject will walk and run for 10 meters at a low a self selected speed in the Gait Lab.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age

Adults (18-64 years)

Elderly (65 years and older)

Inclusion criteria

Healthy group:

Subjects should be active at least once a week in sports activities which have running, jumping and landing components such as running, soccer, basketball etc.

Age range should be between 18 - 55 years-old.

Patient group:

Subjects should be active athletes in sports activities which have running, jumping and landing components such as running, soccer, basketball etc.

Age range should be between 18 - 55 years-old. ;Patients should fulfil following clinical diagnostic criteria of Achilles tendinopathy:

- (a) Non-insertional tendinopathy (2 to 6 cm proximal to the insertion of the Achilles tendon into the calcaneus)
- (b) Abnormality in ultrasound imaging (The ultra sound testing will be performed in the context of the regular patient care by the sports physician and is no part of this study).
- (c) Pain for at least 3 months only in one limb
- (d) Score in VISA-A questionnaire < 80

Exclusion criteria

- (a) Current pain in lower limb and back (only exception is Achilles tendinopathy for patient group)
- (b) Past lower limb trauma that has caused current imbalance in walking or running
- (c) Current neurological and metabolic disorders that have effect on lower limb function (diagnosed by sports physician)
- (d) Current inflammatory arthritis of foot, ankle, knee, hip and back. (diagnosed by sports physician)
- (e) Lack of normal lower extremity function that interferes with normal walking and running pattern (diagnosed by sports physician)

Study design

Design

Study type:	Observational non invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)

Primary purpose: Treatment

Recruitment

NL
Recruitment status: Recruitment stopped
Start date (anticipated): 08-09-2011
Enrollment: 32
Type: Actual

Ethics review

Approved WMO
Date: 04-04-2011
Application type: First submission
Review commission: METC Universitair Medisch Centrum Groningen (Groningen)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL34288.042.11