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Master track and field athletes' perception of multimodal chiropractic care on sports performance, and its impact on muscular capacities

Submission date 19/01/2022	**Recruitment status** No longer recruiting	[X] Prospectively registered [X] Protocol
Registration date 20/01/2022	**Overall study status** Completed	[X] Statistical analysis plan [_] Results
Last Edited 30/10/2024	**Condition category** Other	[_] Individual participant data [X] Record updated in last year

Plain English summary of protocol

Background and study aims

Athletes want to optimise their performance and prevent injuries, and they typically explore many different strategies to give them a competitive advantage in sports events. Worldwide, manual therapies and chiropractic have been increasingly used in sports to help elite and masters athletes with pain management, return to sports and rehabilitation after an injury, injury prevention, enhancement of performance, and to recover faster after competitions. Pre-competition chiropractic care may be a way to identify and prevent a potential injury and to contribute to enhancing sports performance in masters athletes. Although there is vast research addressing the role of the best and common practices of chiropractic in older adults, none of them so far have included the ageing athletic population until now.

Therefore, the aim of this study is to explore and increase the understanding of aged 60+ years athletes' perceptions of the chiropractic encounter, the biomechanical and sports performance experiences, and its potential short-term functional impacts on plantar flexor muscle strength and accuracy sensory motor skills.

Who can participate?

Active track and field athletes aged 60 years and older from different clubs in the UK who compete at the national or/and international level from the disciplines of jumping, hurdling, sprinting, or distance running. Athletes with previous chiropractic care experience will be able to participate as the intervention group.

What does the study involve?

This study investigates whether there is any short-term functional impact on plantar flexor muscle maximum isometric strength and accuracy sensori-motor skill performances after one session of chiropractic care before competition. The chosen control will be a passive rest (times between PRE1-PRE2 and PRE2-PRE3) to minimise any sham-treatment effects. The study will be done at the track and field athletic venues or the chiropractic clinic at Friern Barnet or the biomechanical lab. The study design consists of two stations. One is for the outcome measures

and the second for the intervention/control. Biomechanical testing of the muscles takes 20 minutes and is performed three times: the start/baseline (PRE1) the middle (PRE2) and after the intervention (POST) or rest control (PRE3). The entire procedure lasts 120 minutes.

What are the possible benefits and risks of participating?
It is expected that the evaluation and research process will contribute to our knowledge to offer guidelines to older master athletes and sports chiropractors. The study findings might be transferable to other master sports and manual therapy services working with an active ageing cohort.

Where is the study run from?
London South Bank University (UK)

When is the study starting and how long is it expected to run for?
July 2021 to June 2023

Who is funding the study?
Investigator initiated and funded

Who is the main contact?
Claudio Merkier
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Study website
https://osf.io/p9dha/?view_only=8cdbf44b7c65481f8f76ede7907463c0

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Additional identifiers

EudraCT/CTIS number
2021-005437-17

IRAS number
303735

ClinicalTrials.gov number
Nil known

Secondary identifying numbers
IRAS 303735

Study information

Scientific Title
Older MAster Track and Field AThletes PercEptions and Functional Impacts of PRe-Competition Chiropractic MAnual Therapies on Plantar FlexoR Muscle Strength, Accuracy Motor Skill and Sports PerformancE (MasterCare)

Acronym
MasterCare

Study objectives
Pre-competition chiropractic manual therapies improve maximum voluntary isometric contraction strength and accuracy motor coordination skill performances (slow and fast) more than rest control on plantar flexor muscles in healthy competing older masters track and field athletes.

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 04/01/2022, Institute of Health and Social Care School of Ethics Panel at London South Bank University (Institute of Health and Social Care, London South Bank University, 103 Borough Road, London, SE1 0AA, UK; +44 (0)20 7815 7931; stewara2@lsbu.ac.uk), ref: ETH2021-0198

Study design

Multicenter interventional pragmatic non-randomized feasibility trial

Primary study design
Interventional

Secondary study design
Non randomised study

Study setting(s)
Community

Study type(s)
Treatment

Participant information sheet
See additional file

Health condition(s) or problem(s) studied
Pre-competition sports performance

Interventions
Current interventions as of 10/07/2023:

A 20-min session of chiropractic manual therapies (intervention) or 20 min of rest (control) prior to the participant's athletics competition event (not less than 24 hours).

This study is a non-randomised feasibility trial to investigate if there is any short-term functional impact on plantar flexor muscle strength and accuracy sensory-motor coordination performances after one session of chiropractic manual therapies prior to competition. The trial will be done at the track and field athletic venues or chiropractic clinics, within 24 hours prior to competing and during the 2022-23 seasons.

The trial protocol design consists of two stations. One is for the outcome measures and the second is for the intervention/control. The chosen intra-participant control will be a passive rest. Biomechanical testing includes maximum voluntary isometric contraction (MVIC) strength of plantar flexor muscles, slow (60 s) accuracy sensory-motor coordination performances of plantar flexor muscles (Slow delay: 60secs and fast delay: 15secs).
All the measurements of one round will take about 20 min. The biomechanical tests will be repeated three times: baseline (PRE1), middle (PRE2) and after (POST) intervention. The three biomechanical outcomes for the ankle plantar flexors are measured by a dynamometer and computer software (two custom-made strain gauge type dynamometers of 1,000 Hz, ankle and knee angle fixed at 90° to determine plantar-flexion moments and coordination for both legs separately and a visual feedback system developed with LabVIEW-2013 SP1-National Instruments, Austin, TX). The entire procedure will last 120 min. The biomechanical section of the protocol (20 mins) has already been tested in older adults as reliable and valid outcomes (Epro et al. 2018). The performance outcome measures will be analysed using SPSS, including the 95% confidence interval ($p<0.05$) and 80% power sample size calculations.

Previous interventions as of 03/04/2023:

A 20-min session of chiropractic manual therapies (intervention) or 20 min of rest (control) prior to the participant's athletics competition event (not less than 24 hours).

This study is a non-randomised feasibility trial to investigate if there is any short-term functional impact on plantar flexor muscle strength and accuracy motor skill performances after one session of chiropractic manual therapies prior to competition. The trial will be done at the track and field athletic venues, within 24 hours prior to competing and during the 2022-23 seasons. The control group will be tested at Friern Barnet Chiro-Practice or at the biomechanical lab at London South Bank University.

The trial protocol design consists of two stations. One is for the outcome measures and the second for the intervention/control. The chosen control will be a passive rest to minimise any sham-treatment effects. Biomechanical testing includes maximum voluntary isometric contraction (MVIC) strength of plantar flexor muscles, slow (60 s) accuracy motor coordination skill performances (AMS-60) of plantar flexor muscles and fast (15 s) accuracy motor coordination skill performances (AMS-15) of plantar flexors muscles. All these measurements will take 20 min. The biomechanical tests will be measured three times: baseline (PRE1), middle (PRE2) and after (POST) intervention. The three biomechanical outcomes for the bilateral ankle plantar flexor moment are measured by a dynamometer and computer software (two custom-made strain gauge type dynamometers of 1,000 Hz, ankle and knee angle fixed at 90° to determine plantar-flexion moments for both legs separately and a visual feedback system developed with LabVIEW-2013 SP1-National Instruments, Austin, TX). The entire procedure will last 120 min. The biomechanical section of the protocol (20 mins) has been already tested in older adults as reliable and valid outcomes (Epro et al. 2018). The performance outcome measures will be analysed by using SPSS by including the 95% confidence interval ($p<0.05$) and 80% power sample size calculations.

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Previous interventions as of 06/03/2023:

A 20-min session of chiropractic manual therapies (intervention) or 20 min of rest (control) prior to the participant's athletics competition event (not less than 24 hours).

This study is a non-randomised feasibility trial to investigate if there is any short-term functional impact on plantar flexor muscle strength and accuracy motor skill performances after one session of chiropractic manual therapies prior to competition. The trial will be done at the track and field athletic venues, within 24 hours prior to competing and during the 2022 season.

The trial protocol design consists of two stations. One is for the outcome measures and the second for the intervention/control. The chosen control will be a passive rest to minimise any sham-treatment effects. Biomechanical testing includes maximum voluntary isometric contraction (MVIC) strength of plantar flexor muscles, slow (60 s) accuracy motor coordination skill performances (AMS-60) of plantar flexor muscles and fast (15 s) accuracy motor coordination skill performances (AMS-15) of plantar flexors muscles. All these measurements will take 20 min. The biomechanical tests will be measured three times: baseline (PRE1), middle (PRE2) and after (POST) intervention. The three biomechanical outcomes for the bilateral ankle plantar flexor moment are measured by a dynamometer and computer software (two custom-made strain gauge type dynamometers of 1,000 Hz, ankle and knee angle fixed at 90° to determine plantar-flexion moments for both legs separately and a visual feedback system developed with LabVIEW-2013 SP1-National Instruments, Austin, TX). The entire procedure will

last 120 min. The biomechanical section of the protocol (20 mins) has been already tested in older adults as reliable and valid outcomes (Epro et al. 2018). The performance outcome measures will be analysed by using SPSS by including the 95% confidence interval ($p<0.05$) and 80% power sample size calculations.

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Previous interventions:

A 20-min session of chiropractic manual therapies (intervention) or 20 min of rest (control) within the 24 h prior to the participant's athletics competition event.

This study is a non-randomised feasibility trial to investigate if there is any short-term functional impact on plantar flexor muscle strength and accuracy motor skill performances after one session of chiropractic manual therapies prior to competition. The trial will be done at the track and field athletic venues, within 24 h prior to competing and during the 2022 season.

The trial protocol design consists of two stations. One is for the outcome measures and the second for the intervention/control. The chosen control will be a passive rest to minimise any sham-treatment effects. Biomechanical testing includes maximum voluntary isometric contraction (MVIC) strength of plantar flexor muscles, slow (60 s) accuracy motor coordination skill performances (AMS-60) of plantar flexor muscles and fast (15 s) accuracy motor coordination skill performances (AMS-15) of plantar flexors muscles. All these measurements will take 20 min. The biomechanical tests will be measured three times: baseline (PRE1), middle (PRE2) and after (POST) intervention. The three biomechanical outcomes for the bilateral ankle plantar flexor moment are measured by a dynamometer and computer software (two custom-made strain gauge type dynamometers of 1,000 Hz, ankle and knee angle fixed at 90° to determine plantar-flexion moments for both legs separately and a visual feedback system developed with LabVIEW-2013 SP1-National Instruments, Austin, TX). The entire procedure will last 120 min. The biomechanical section of the protocol (20 mins) has been already tested in older adults as reliable and valid outcomes (Epro et al. 2018). The performance outcome measures will be analysed by using SPSS by including the 95% confidence interval ($p<0.05$) and 80% power sample size calculations.

Intervention Type
Procedure/Surgery

Primary outcome measure
Current primary outcome measures as of 06/03/2023:
Measured by a dynamometer at baseline (PRE1), again after 20 min of rest (PRE2) and again after the chiropractic intervention (POST) or rest control (PRE3).
1. Maximum voluntary isometric contraction (MVIC) strength of the plantar flexor muscles
2. Slow accuracy motor skill (AMSS) performance of the plantar flexor muscles
3. Fast accuracy motor coordination skill (AMSF) performance of the plantar flexors muscles

Previous primary outcome measures from 20/05/2022 to 06/03/2023:
Measured by a dynamometer at baseline (PRE1), again after 20 min of rest (PRE2) and again after the chiropractic intervention (POST):
1. Maximum voluntary isometric contraction (MVIC) strength of the plantar flexor muscles
2. Slow accuracy motor skill (AMSS) performance of the plantar flexor muscles
3. Fast accuracy motor coordination skill (AMSF) performance of the plantar flexors muscles

Previous primary outcome measure:
Measured by a dynamometer at baseline (PRE1), again after 20 min of rest (PRE2) and again after the chiropractic intervention (POST):
1. Maximum voluntary isometric contraction (MVIC) strength of the plantar flexor muscles
2. Slow (60 s) accuracy motor skill (AMS-60) performance of the plantar flexor muscles
3. Fast (15 s) accuracy motor coordination skill (AMS-15) performance of the plantar flexors muscles

Secondary outcome measures
1. Expected and perceived impact of MVIC measured using the global perceived effect (GPE) of change (7 points Likert scale) at POST intervention at 100 min from the baseline
2. Expected and perceived impact of AMS-60 measured using the global perceived effect (GPE) of change (7 points Likert scale) at POST intervention at 100 min from the baseline
3. Expected and perceived impact of AMS-15 measured using the global perceived effect (GPE) of change (7 points Likert scale) at POST intervention at 100 min from the baseline

Overall study start date
18/07/2021

Completion date
30/06/2023

Eligibility

Key inclusion criteria
Current inclusion criteria as of 06/03/2023:
1. Active track and field athletes from different masters athletics clubs in the UK who have been competing at regional, national or/and international levels (Intervention group)
2. Aged 60 years and older (intervention and control groups)
3. The main athlete’s event is jumping, hurdling, sprinting, or distance running (intervention group)
4. The athlete has previous experience with chiropractic and manual therapies (intervention group)

Previous inclusion criteria:
1. Active track and field athletes from different masters athletics federation clubs in the UK who have been competing at regional, national or/and international levels
2. Aged 60 years and older
3. The main athlete’s event is jumping, hurdling, sprinting, or distance running
4. The athlete has previous experience with chiropractic and manual therapies

Participant type(s)
Healthy volunteer

Age group
Senior

Sex
Both

Target number of participants

15 (intervention group); 10 (control group)

Key exclusion criteria
Current exclusion criteria as of 06/03/2023:
1. Athletes or older adults aged 60+ with a history of any surgery or Achilles tendon's ruptures and/or problems (tendinopathies etc) within a 6-month period prior to trial
2. The main athlete’s event category is not jumping, hurdling, sprinting, or running (intervention group)
3. A score of 0, 1, or 2 in any item in the Lower Extremity Functional Scale (LEFS) (Binkley et al., 1999) during the recruitment process as a safety rule to minimise the risk of injury during the trial. A copy of the LEFS score will be sent to the potential participant by email or post in advance and completed at the beginning of the data collection research day

Previous exclusion criteria:
1. Athletes with a history of any surgery or Achilles tendon's ruptures and/or problems (tendinopathies etc) within a 6-month period prior to trial
2. The main athlete’s event category is not jumping, hurdling, sprinting, or running
3. A score of 0, 1, or 2 in any item in the Lower Extremity Functional Scale (LEFS) (Binkley et al., 1999) during the recruitment process as a safety rule to minimise the risk of injury during the trial. A copy of the LEFS score will be sent to the potential participant by email or post in advance and completed at the beginning of the data collection research day

Date of first enrolment
22/01/2022

Date of final enrolment
31/05/2023

Locations

Countries of recruitment
England

United Kingdom

Study participating centre
London South Bank University
103 Borough Road
London
United Kingdom
SE1 0AA

Study participating centre
Lee Valley Athletics Centre
Lee Valley Leisure Complex
61 Meridian Way
Edmonton

London
United Kingdom
N9 0AR

Study participating centre
Derby Athletics Club
Moorways Stadium
Moor Lane
Allenton
Derby
United Kingdom
DE24 9HY

Study participating centre
Horspath Athletics and Sports Ground
Horspath Rd
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OX4 2RR

Study participating centre
The Pingles Stadium
Avenue Road
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CV11 4LX

Study participating centre
Battersea Park Millennium Arena
East Carriage Drive
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SW11 4NJ

Study participating centre
Friern Barnet Chiro-Practice
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Friern Barnet

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Study participating centre
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Sponsor type
University/education

Website
http://www.lsbu.ac.uk/

ROR
https://ror.org/02vwnat91

Funder(s)

Funder type
Other

Funder Name
Investigator initiated and funded

Results and Publications

Publication and dissemination plan
Results are planned to be published in a high impact peer-reviewed journal such as Chiropractic and Manual Therapies after completion of data analysis. The study protocol and statistical analysis plan will be available. The study has been registered at the open science framework website (https://osf.io/p9dha/).

Intention to publish date
01/10/2024

Individual participant data (IPD) sharing plan
All IPD will be stored in a non-publicly available repository and will be kept strictly confidential (subject to legal limitations). Data generated by the study will be retained in accordance with the University's Code of Practice. Digital recordings and records will be stored on an LSBU password protected server accessible only by the project team. Non-anonymised data (personal data) data will be stored for exactly as long as it is needed in compliance with the General Data Protection Regulations. All personal data will be kept for a period of 10 years after the completion of the project and then destroyed. In the write up of the study, all data will be completely anonymised. No names or any identifiable information will be included.

IPD sharing plan summary
Stored in non-publicly available repository, Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Feasibility trial procedure		23/06/2022	No	Yes
Protocol file			23/06/2022	No	No
Statistical Analysis Plan			27/03/2023	No	No