

Clinical Trial Protocol

Iranian Registry of Clinical Trials

11 Sep 2026

Neuromuscular training program for treatment of male basketball players with medial tibial stress syndrome: emphasis on attentional focus and external cues in functional movement training.

Protocol summary

Study aim

Comparison of neuromuscular exercises with external focus with therapeutic exercises on reduce pain, Improvem function, kinematic and kinetic in men basketball players with medial tibial stress syndrome

Design

Two arm parallel group randomised trial with blinded outcome assessment

Settings and conduct

Assessments are in baseline, after 6-week intervention, 3, 6, and 12 months of follow-up by a blind assessor, and variables include pain, function, muscle strength, kinematics, and kinetics. All measurements are performed in the university laboratory.

Participants/Inclusion and exclusion criteria

Inclusion criteria included those aged between 18 and 35 years with medial tibial stress syndrome for at least 3 weeks' exercise, induced pain that is located on the posteromedial border of the tibia, palpation of the posteromedial border of the tibia that produces discomfort, will be diagnosed experience sports medicine. The exclusion criteria will be having a history of tibial fracture, clinical suspicion of chronic compartment syndrome or stress fracture.

Intervention groups

In Experimental Group 1 (neuromuscular exercises with external focus) include eight types of exercises, double-leg squat, single-leg squat, lunges (walking), double-leg drop jump, single-leg standing on an unstable plate, sidestep cutting maneuver, single-leg hop for distance, vertical jump, and Countermovement jump. In Experimental Group 2 (therapeutic exercises), the exercises consisted of 3 stages of release techniques (use of foam roll with focus on lateral gastrocnemius, peroneals, and biceps femoris (short head) muscles), stretching (focusing on gastrocnemius/soleus, and biceps femoris (short head), is activation (increasing the

strength of the muscles of the anterior, posterior tibialis, and medial hamstrings).

Main outcome variables

Pain, function, lower limbs muscle strength, kinematics, and kinetics

General information

Reason for update

Adding the volume of the true sample and the start and end date of the patient recruitment.

Acronym

IRCT registration information

IRCT registration number: **IRCT20210718051938N1**

Registration date: **2021-08-01, 1400/05/10**

Registration timing: **prospective**

Last update: **2023-05-27, 1402/03/06**

Update count: **2**

Registration date

2021-08-01, 1400/05/10

Registrant information

Name

Mojtaba Jahanshahi

Name of organization / entity

Kharazmi University

Country

Iran (Islamic Republic of)

Phone

+98 26 3457 9600

Email address

mojtaba_jahanshahi@yahoo.com

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2021-08-09, 1400/05/18
Expected recruitment end date
2021-09-16, 1400/06/25
Actual recruitment start date
2021-08-11, 1400/05/20
Actual recruitment end date
2021-10-30, 1400/08/08
Trial completion date
empty

Scientific title
Neuromuscular training program for treatment of male basketball players with medial tibial stress syndrome: emphasis on attentional focus and external cues in functional movement training.

Public title
Effect of neuromuscular training on improving medial tibial stress syndrome

Purpose
Treatment

Inclusion/Exclusion criteria
Inclusion criteria:
Male basketball players between 18 and 35 years ages
For at least 3 weeks' exercise, induced pain located on the posteromedial border of the tibia, palpation of the posteromedial border of the tibia that produces discomfort, will be diagnosed by experienced sports medicine.

Exclusion criteria:
Having a history of tibial fracture
Clinical suspicion of chronic compartment syndrome or stress fracture

Age
From **18 years** old to **35 years** old

Gender
Male

Phase
N/A

Groups that have been masked

- Outcome assessor

Sample size
Target sample size: **72**
Actual sample size reached: **78**

Randomization (investigator's opinion)
Randomized

Randomization description
Following the baseline examination, by using the method on the website <http://randomizer.org> participants are randomly assigned into the two experimental groups (neuromuscular training with an attentional focus), (therapeutic exercise), and control group. Simple randomization is used. Concealed allocation is performed using a computer generated block randomized table of numbers (1 and 2 for experimental groups and 3 for control group) created before the start of data collection by researcher who is not involved in the recruitment or treatment of patients. Then, the random numerical sequence is placed in sealed opaque envelope and processed with treatment according to the group assignment. A blinded outcome assessor who does not know the hypothesis and study methods, measures

outcome at baseline, 6 weeks post-intervention, and 12 weeks follow-up.

Blinding (investigator's opinion)
Single blinded

Blinding description
In this study, the outcome assessor was blind to the process of randomization and assignment of individuals into two experimental groups and control group.

Placebo
Not used

Assignment
Parallel

Other design features

Secondary Ids
empty

Ethics committees

1

Ethics committee
Name of ethics committee
Sport Sciences Research Institute
Street address
No. 3, 5th Alley, Miremad Street, Motahhari Street, Tehran
City
Tehran
Province
Tehran
Postal code
1587958711

Approval date
2021-06-21, 1400/03/31
Ethics committee reference number
IR.SSRC.REC.1400.053

Health conditions studied

1

Description of health condition studied
Medial tibial stress syndrome
ICD-10 code
S86.89
ICD-10 code description
Other injury of other muscles and tendons at lower leg level

Primary outcomes

1

Description
Pain
Timepoint
Baseline, 6 weeks after intervention, 3, 6, and 12 months follow up
Method of measurement
How to measure a variable is using Visual Analogue

Scale

Secondary outcomes

1

Description

Function

Timepoint

Baseline, 6 weeks after intervention, 3, 6, and 12 months follow up

Method of measurement

How to measure a variable is using vertical jump

2

Description

Muscle strength

Timepoint

Baseline, 6 weeks after intervention, 3, 6, and 12 months follow up

Method of measurement

How to measure a variable is using Biodex System isokinetic.

3

Description

Kinematic

Timepoint

Baseline, 6 weeks after intervention, 3, 6, and 12 months follow up

Method of measurement

How to measure a variable is using Visual3D software (C-motion Inc, Germantown).

4

Description

Kinetic, Tibia acceleration and Time to Stabilization

Timepoint

Baseline, 6 weeks after intervention, 3, 6, and 12 months follow up

Method of measurement

How to measure a variable is using Two three-axis force plates (AMTI model) in vertical, anterior-posterior, and medial-lateral.

Intervention groups

1

Description

First intervention group: Benjaminse et al. (2015) training protocol will be used for the first intervention group. These exercises include eight different types of exercises, in each of which the feedback and verbal training appropriate to that exercise is given to the subjects before the exercise and also during the exercise. People will receive the necessary feedback during practice and will perform well. Feedback exercises include eight types of exercises, double-leg squat, single-

leg squat, lunges (walking), double-leg drop jump, single-leg standing on an unstable plate, sidestep cutting maneuver, single-leg hop for distance, vertical jump, and Countermovement jump. During the exercises, the feedback instructions verbally and visually, using learning strategies, applied external attention to the subjects, and influenced their movements during the exercise. For example, in order to perform single-leg squat movements, subjects are asked to stand in front of a conical obstacle and slowly bend their legs in the direction of the cone while descending and bending their knees, focusing on the cone. External focus).

Category

Rehabilitation

2

Description

Second intervention group: Second intervention group: Exercises include 3 stages of release, stretching, and activation techniques. The subject is asked to participate in the main exercise program after warm-up, which includes release, stretching, and activation exercises. In the first phase, people will use release exercises using a foam roll focusing on the lateral gastrocnemius, peroneals, and biceps femoris (short head) muscles. Exercises with two high intensities (maximum pain tolerance) are performed in 30 seconds or low intensity (minimum pain tolerance) in 90 seconds. Stretching phase exercises are performed focusing on the gastrocnemius/soleus, and biceps femoris (short head). The intensity and volume of the exercises include 3 sets of 30 seconds. The third phase, the activation phase, will focus on increasing the strength of the anterior, posterior tibialis, and medial hamstring muscles. These exercises are performed with 10 to 15 repetitions and each repetition includes 1 to 2 seconds, maintaining isometric contraction at the end of the range of motion and 4 seconds maintaining extroverted contraction.

Category

Rehabilitation

3

Description

Control group: The control group will not receive any intervention and will perform their routine (basketball) exercises.

Category

N/A

Recruitment centers

1

Recruitment center

Name of recruitment center

Kharazmi University Health Center

Full name of responsible person

Mojtaba Jahanshahi

Street address

No. 126, Poneh gharbi street, Goolshahr

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity
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Full name of responsible person
Amir Letafatkar
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Center for Human Movement Sciences Kharazmi
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Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?

No

Title of funding source

No governmental fund has been received for this study,
and it is conducted by researchers.

Proportion provided by this source

100

Public or private sector

Private

Domestic or foreign origin

Domestic

Category of foreign source of funding

empty

Country of origin

Type of organization providing the funding

Persons

Person responsible for general inquiries

Contact

Name of organization / entity
Kharazmi Univesity
Full name of responsible person
Amir Letafatkar
Position

Assistant professor
Latest degree
Ph.D.
Other areas of specialty/work
Sports science
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Person responsible for updating data

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Sharing plan**Deidentified Individual Participant Data Set (IPD)**

Yes - There is a plan to make this available

Study Protocol

Yes - There is a plan to make this available

Statistical Analysis Plan

Yes - There is a plan to make this available

Informed Consent Form

Yes - There is a plan to make this available

Clinical Study Report

Yes - There is a plan to make this available

Analytic Code

Undecided - It is not yet known if there will be a plan to
make this available

Data Dictionary

Undecided - It is not yet known if there will be a plan to
make this available

Title and more details about the data/document

Only data related to demographic and outcomes
information is shared.

When the data will become available and for how long

After publishing the article / articles extracted from the
study.

To whom data/document is available

The data can be displayed and shared at the reasonable
request of the Iranian Clinical Trial Registration Center,
journals and university individuals / researchers who are
conducting research and scientific activities in this field.

Under which criteria data/document could be used

Data analysis and use of documents can only be done
provided that their results are presented in systematic
review articles conducted by researchers and academic
researchers. Necessary conditions for sending data and
documents include: 1. Sending an email (preferably with
valid university addresses) to one of the researchers of
the study. 2. A brief and logical explanation of how to
use the data or documents. 3. Ensuring the registration
of the protocol Systematic review studies that have
requested access to data or documentation.

From where data/document is obtainable

Through requesting from Mojtaba Jahanshahi: Mojtaba-
jahanshahi@yahoo.com Amir Letafatkar:
letafatkaramir@yahoo.com Robert baker:
rb415@comcast.net Michael Fredericson:
mfred2@stanford.edu

What processes are involved for a request to access data/document

The applicant can request details from the researchers
within 7 to 14 days using the message sent by email.

Comments