Clinical Trial Protocol
Iranian Registry of Clinical Trials

09 Nov 2026

Effectiveness of six weeks TRX exercises on functional movement screen test, landing and dynamic balance in athletes with a history of anterior cruciate ligament reconstruction: a randomized control trial

Protocol summary

Study aim
Evaluating the effectiveness of 6 weeks of TRX training on the functional movement screening test, landing mechanics, and dynamic balance in athletes with a history of anterior cruciate ligament reconstruction.

Design
A controlled clinical trial with parallel groups, single-blind, randomized, phase 3, conducted on 26 patients. Computer software was used for randomization

Settings and conduct
Athletes with a history of anterior cruciate ligament reconstruction who underwent surgery under the supervision of Dr. Mohammadreza Sobhan and had at least 9 months elapsed since their reconstruction surgery were invited to participate in this study

Participants/Inclusion and exclusion criteria
Being male, completion of the rehabilitation program, more than 9 months elapsed since ACLR

Intervention groups
Intervention group: TRX exercises Control group: Did not receive any training

Main outcome variables
Scores of the Functional Movement Screen (FMS) test; landing mechanics; dynamic balance

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20250519065806N1**
Registration date: **2025-05-27, 1404/03/06**
Registration timing: **registered_while_recruiting**

Last update: **2025-05-27, 1404/03/06**
Update count: **0**

Registration date
2025-05-27, 1404/03/06

Registrant information

Name
Mostafa Jalili Bafrouei

Name of organization / entity
University of Tehran

Country
Iran (Islamic Republic of)

Phone
+98 21 8837 2580

Email address
m.jalili.b@ut.ac.ir

Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2025-05-21, 1404/02/31

Expected recruitment end date
2025-06-20, 1404/03/30

Actual recruitment start date
empty

Actual recruitment end date
empty

Trial completion date
empty

Scientific title
Effectiveness of six weeks TRX exercises on functional movement screen test, landing and dynamic balance in athletes with a history of anterior cruciate ligament reconstruction: a randomized control trial

Public title
Effect of 6-week TRX exercises for ACLR

Purpose
Supportive

Inclusion/Exclusion criteria

Inclusion criteria:
Willingness to participate in the intervention Male gender Age between 14 and 40 years Having at least three years of sports activity experience Engaging in regular sports activity, with 3 sessions per week before the injury History of anterior cruciate ligament (ACL) reconstruction surgery, with at least 9 months elapsed since the operation Completion of rehabilitation stages Use of Arthrex graft

Exclusion criteria:
History of previous ACL injury Bone fracture associated with ACL injury Significant injury other than ACL Uncontrolled diabetes or high blood pressure Failure to participate in more than 2 training sessions

Age
From **14 years** old to **40 years** old

Gender
Male

Phase
3

Groups that have been masked

- Outcome assessor
- Data analyser

Sample size
Target sample size: **26**
More than 1 sample in each individual
Number of samples in each individual: **1**
ACLR data of knee function

Randomization (investigator's opinion)
Randomized

Randomization description
After baseline measurements, participants will receive unique individual codes (numerical identifiers). Intervention group (INT): Participants with even-numbered codes. Control group (CON): Participants with odd-numbered codes. Codes are placed in sealed, opaque envelopes to ensure allocation concealment. Neither participants nor researchers involved in outcome assessments or data analysis will know group assignments (double-blind design). A research assistant will generate the randomization sequence using a computerized program. Allocation results will be securely stored in sealed envelopes and distributed to participants.

Blinding (investigator's opinion)
Single blinded

Blinding description
Outcome assessor and data and statistical analyzer will be blinded from knowing intervention groups. This individual, a physiotherapist, is blinded to group allocation and is unaware of which participants belong to the intervention group and which belong to the control group.

Placebo
Not used

Assignment
Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee
Ethics committee of faculty of sport science and health, university of Tehran

Street address
North kargar street, faculty of sport science and health, university of Tehran

City
Tehran

Province
Tehran

Postal code
1664918948

Approval date
2023-07-11, 1402/04/20

Ethics committee reference number
IR.UT.SPORT.REC.1402.051

Health conditions studied

1

Description of health condition studied
Anterior cruciate ligament reconstruction

ICD-10 code
S83.5

ICD-10 code description
Sprain of cruciate ligament of knee

Primary outcomes

1

Description
Dynamic balance, landing mechanism, functional movement screen

Timepoint
First week and after 6 weeks

Method of measurement
Y-balance test, Landing Error Screen System, Functional Movement Screen Test

Secondary outcomes

empty

Intervention groups

1

Description
Intervention Group: TRX Exercises. After obtaining the ethical approval code, athletes with a history of anterior cruciate ligament reconstruction who underwent surgery

under the supervision of Dr. Mohammadreza Sobhan, and at least 9 months have passed since their reconstruction surgery, will be invited to participate in this study. To invite participants, the researcher will visit the physician’s office and, after reviewing the medical records of individuals who have undergone ACL reconstruction, will select samples for this study based on the inclusion and exclusion criteria. These criteria will be evaluated through contact with the individuals. Based on the sample size assessment and their initial willingness to participate, the study’s objectives and the potential positive and negative outcomes of participation will be explained to them. They will also be assured that they can withdraw from the study at any stage if they no longer wish to continue. Then, the informed consent form will be provided to those who confirm their willingness to participate, and they will be asked to sign it. Following this, demographic information including age, weight, height, history of sports activity, type of sport, duration of sports participation before injury (number of sessions per week), and injury history will be collected through face-to-face interviews. In this study, the Functional Movement Screen (FMS) test will be used to assess motor performance. Landing mechanics and dynamic balance will be measured using the Landing Error Scoring System (LESS) and the Y-Balance Test, respectively. Before starting the exercises, a pre-test will be conducted for all participants in the intervention group, with the order of the pre-test standardized for all individuals. Participants in the intervention group will perform TRX exercises for 6 weeks, with 3 sessions per week. The exercise program for this study was adapted from the study by You et al. At the beginning of each training session, participants will perform a 10-minute warm-up. Additionally, a 5-minute cool-down will be conducted after the exercises. After completing the training program, a post-test identical to the pre-test will be administered to all participants, and the results will be recorded, reviewed, and evaluated

Category

Rehabilitation

2

Description

Control group: no intervention. After obtaining the ethical approval code, athletes with a history of anterior cruciate ligament reconstruction who underwent surgery under the supervision of Dr. Mohammadreza Sobhan, and at least 9 months have passed since their reconstruction surgery, will be invited to participate in this study. To invite participants, the researcher will visit the physician’s office and, after reviewing the medical records of individuals who have undergone ACL reconstruction, will select samples for this study based on the inclusion and exclusion criteria. These criteria will be evaluated through contact with the individuals. Based on the sample size assessment and their initial willingness to participate, the study’s objectives and the potential positive and negative outcomes of participation will be explained to them. They will also be assured that they can withdraw from the study at any stage if they no longer wish to continue. Then, the informed consent form will be provided to those who confirm their willingness to participate, and they will be asked to sign it. Following this, demographic information including age, weight, height, history of sports activity, type of sport, duration of sports participation before injury (number of sessions per week), and injury history will be collected through face-to-face interviews. In this study, the Functional Movement Screen (FMS) test will be used to assess motor performance. Landing mechanics and dynamic balance will be measured using the Landing Error Scoring System (LESS) and the Y-Balance Test, respectively. Before starting the exercises, a pre-test will be conducted for all participants in the control group, with the order of the pre-test standardized for all individuals. In the control group, no intervention will be performed for 6 weeks, and individuals will continue their normal daily activities

Category

Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center

Arvand physiotherapy

Full name of responsible person

Mostafa Jalili Bafrouei

Street address

No 64, Darya Ave, Sa'adat abad Blvd

City

Tehran

Province

Tehran

Postal code

1466983465

Phone

+98 21 8837 2580

Email

jalilimostafa3@gmail.com

Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Deputy for research affairs, faculty of health University of Tehran

Full name of responsible person

Seyed Hamed Mousavi

Street address

17th Kargar

City

Tehran

Province

Tehran

Postal code

1664918948

Phone

+98 21 6111 8807

Email
Hamedmusavi@ut.ac.ir
Grant name
Seyed Hamed Mousavi
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Deputy for research affairs, faculty of health University of Tehran
Proportion provided by this source
100
Public or private sector
Public
Domestic or foreign origin
Domestic
Category of foreign source of funding
empty
Country of origin
Type of organization providing the funding
Academic

Person responsible for general inquiries

Contact
Name of organization / entity
University of Tehran
Full name of responsible person
Seyed Hamed Musavi
Position
Assistant professor
Latest degree
Ph.D.
Other areas of specialty/work
Sport Medicine
Street address
17 north kargar
City
Tehran
Province
Tehran
Postal code
1664918948
Phone
+98 21 6111 8807
Email
musavihamed@ut.ac.ir

Person responsible for scientific inquiries

Contact
Name of organization / entity
University of Tehran
Full name of responsible person
Mostafa Jalili Bafrouei
Position
PhD student
Latest degree
Master
Other areas of specialty/work
Sport Medicine
Street address
17th north kargar
City
Tehran
Province
Tehran
Postal code
1664918948
Phone
+98 21 9109 9511
Email
m.jalili.b@ut.ac.ir

Person responsible for updating data

Contact
Name of organization / entity
University of Tehran
Full name of responsible person
Mostafa Jalili Bafrouei
Position
PhD student
Latest degree
Master
Other areas of specialty/work
Sport Medicine
Street address
17th north kargar
City
Tehran
Province
Tehran
Postal code
1466983465
Phone
+98 21 9109 9511
Email
m.jalili.b@ut.ac.ir

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
There is no further information
When the data will become available and for how long

3 month after publication

To whom data/document is available

everyone

Under which criteria data/document could be used

For research and rehabilitation

From where data/document is obtainable

Email

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

One week time to gather the needed data

Comments