

Clinical Trial Protocol

Iranian Registry of Clinical Trials

11 Sep 2026

The effect of eight weeks of visual perturbation training on lower extremity biomechanics during unanticipated cutting movements and performance of athletes with anterior cruciate ligament reconstruction: a controlled clinical trial (RCT)

Protocol summary

Study aim

Determining the effect of visual perturbation training on kinematics and kinetics associated with anterior cruciate ligament reinjury during an unanticipated cutting maneuver in athletes

Design

A controlled clinical trial with an intervention group, single-blind, randomized by computer random numbers on 24 athletes with a history of anterior cruciate ligament reconstruction.

Settings and conduct

Eligible athletes were randomly assigned to control or intervention groups using a random number generator. All participants completed a pre-test at the Sport Sciences Research Institute, with data collectors blinded to group allocation. The control group performed only neuromuscular exercises, while the intervention group did the same training combined with visual disturbance using glasses. After eight weeks of training, participants repeated the post-test, and changes in biomechanical variables were analyzed between groups.

Participants/Inclusion and exclusion criteria

Inclusion criteria: Having had a unilateral ACL reconstruction, being within 9-18 months of the reconstruction, having no pain, swelling, and having full and painless range of motion in the knee, ankle, neck, and lumbar joints. Achieving at least 80% of the quadriceps strength of the opposite limb, and performing all hop tests without pain and with an index of at least 80% of the opposite limb. Issuing permission to return to sports by the club's medical team for the athlete. Exclusion criteria: pain during exercise, missing more than 3 training sessions, inability to perform functional tasks (due to visual and/or hearing impairment, vestibular and neurological disorders), re-injury after surgery

Intervention groups

Intervention group: Eight weeks of neuromuscular training with visual disturbance Control group: Eight weeks of neuromuscular training

Main outcome variables

Knee joint kinematic; Knee joint kinetic; Knee joint performance

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20250314065070N1**
Registration date: **2025-06-03, 1404/03/13**
Registration timing: **retrospective**

Last update: **2025-06-03, 1404/03/13**

Update count: **0**

Registration date

2025-06-03, 1404/03/13

Registrant information

Name

Ebrahim Heidarnia

Name of organization / entity

Shahid Beheshti university

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+98 935 364 7198

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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2024-07-02, 1403/04/12

Expected recruitment end date

2025-05-10, 1404/02/20

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

The effect of eight weeks of visual perturbation training on lower extremity biomechanics during unanticipated cutting movements and performance of athletes with anterior cruciate ligament reconstruction: a controlled clinical trial (RCT)

Public title

The effect of visual perturbation training on biomechanics

Purpose

Prevention

Inclusion/Exclusion criteria**Inclusion criteria:**

Having a unilateral autograft ACL reconstruction of the hamstring tendon, being within 9-24 months of the reconstruction surgery, having no pain, no effusion, and having full and painless range of motion in the knee, ankle, neck, and lumbar joints (measured with an electro-goniometer). Achieving at least 80% of the strength of the quadriceps of the opposite limb (measured with a hand-held dynamometer), and performing all hop tests without pain and with an index of at least 80% of the opposite limb. Issuing a return to sports clearance from the club's medical team for the athlete.

Exclusion criteria:

Inability to perform functional tasks (due to visual and/or hearing impairment, vestibular and neurological disorders), Re-injury after surgery.

Age

From **16 years** old to **35 years** old

Gender

Male

Phase

3

Groups that have been masked

- Outcome assessor
- Data analyser

Sample size

Target sample size: **24**

Randomization (investigator's opinion)

Randomized

Randomization description

Randomization will be performed using a computer-generated random block table <http://randomizer.org/> (Social Psychology Network, Connecticut, USA) (1, for the control group - 2, for the visual disturbance group). Random numbers will be placed in sealed envelopes in a box. According to the group assignment, another

researcher (blinded to the baseline assessment) will open the envelopes and continue the exercises.

Blinding (investigator's opinion)

Single blinded

Blinding description

Assessments will be conducted before and after the intervention by two blinded assessors.

Placebo

Not used

Assignment

Parallel

Other design features**Secondary Ids**

empty

Ethics committees**1****Ethics committee****Name of ethics committee**

Research Ethics Committees of Shahid Beheshti University

Street address

Shahid Beheshti University, Shahid Shahriari Square, Evin

City

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Province

Tehran

Postal code

1983969411

Approval date

2025-03-04, 1403/12/14

Ethics committee reference number

IR.SBU.REC.1403.207

Health conditions studied**1****Description of health condition studied**

Anterior cruciate ligament reconstruction

ICD-10 code**ICD-10 code description****2****Description of health condition studied**

Return to sport

ICD-10 code**ICD-10 code description****Primary outcomes****1****Description**

Knee joint kinematic

Timepoint

Pre_test- Post_test(after 8 weeks of training)
Method of measurement
Motion analyze system

2

Description
Knee joint kinetic
Timepoint
Pre-test and post-test (after 8 weeks)
Method of measurement
Force plate

3

Description
Knee joint Performance
Timepoint
Pre-test and post-test (after 8 weeks)
Method of measurement
Jump distance was measured using a tape measure.

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group: visual perturbation + neuromuscular training
Category
Prevention

2

Description
Control group: neuromuscular training
Category
Prevention

Recruitment centers

1

Recruitment center
Name of recruitment center
Shahid Beheshti University
Full name of responsible person
Mostafa Zarei
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Sponsors / Funding sources

1

Sponsor
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Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Iran National Science Foundation
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
Shahid Beheshti University
Full name of responsible person
Ebrahim Heidarnia
Position
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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

Yes - There is a plan to make this available

Data Dictionary

Not applicable

Title and more details about the data/document

After de-identifying the participants' data, the data table will be included in full in the published article of this work.

When the data will become available and for how long

Access period starts 36 months after results are published.

To whom data/document is available

Researcher

Under which criteria data/document could be used

Research

From where data/document is obtainable

E.heydarnia94@gmail.com

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

One week after apply

Comments