Clinical Trial Protocol
Iranian Registry of Clinical Trials

10 Jun 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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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
Tehran
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 perterbation + 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

PhD candidate

Latest degree

Master

Other areas of specialty/work

Sport Rehabilitation

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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