Clinical Trial Protocol
Iranian Registry of Clinical Trials

28 Oct 2026

The effect of neuromuscular training with neurocognitive training on selected psychological, functional and biomechanical factors in male athletes with anterior cruciate ligament reconstruction

Protocol summary

Study aim
The effect of neuromuscular training with neurocognitive training on selected psychological, functional and biomechanical factors in male athletes with anterior cruciate ligament reconstruction

Design
A clinical trial with a control group, with parallel groups, single-blind, randomized, on 45 patients, and Random Allocation Software will be used for randomization.

Settings and conduct
The present study will be conducted at the Kharazmi University. A total of 45 patients with anterior cruciate ligament reconstruction who are eligible for the study are randomly assigned to three groups. The training in intervention groups will be 16 sessions for 8 weeks. Outcome assessor is blind to the participants in each group.

Participants/Inclusion and exclusion criteria
Inclusion criteria: having the surgery of anterior cruciate ligament using auto graft hamstring for the first time, Passing 6 to 9 months after the surgery, Having at least 2 years of experience in the fields of Handball, Basketball, Football and Volleyball in the provincial level, Not having any specific pain and swelling in the knee, Aged between 18-30 , Having completed physiotherapy course, Lack of lower limb abnormalities؛ Exclusion criteria: Hearing and vision problems, Balance problems

Intervention groups
Intervention Group 1: neuromuscular training; Intervention group 2: neuromuscular training with neurocognitive training (Intervention groups 1 and 2 in an 8-week training program, 2 sessions per week for 60 minutes. Each training session will include 10 minutes of warm-up, 45 minutes of training program, and 5 minutes of cooling); Control group 3: The control group is without any training intervention.

Main outcome variables
Psychological, functional and biomechanical factors

General information

Reason for update
Trial completion date

Acronym

IRCT registration information
IRCT registration number: **IRCT20211113053053N1**
Registration date: **2021-12-10, 1400/09/19**
Registration timing: **registered_while_recruiting**

Last update: **2022-04-11, 1401/01/22**
Update count: **2**

Registration date
2021-12-10, 1400/09/19

Registrant information

Name
Hossein Tajdini

Name of organization / entity
Kharazmi University

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Iran (Islamic Republic of)

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Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2021-11-20, 1400/08/29

Expected recruitment end date
2022-01-15, 1400/10/25

Actual recruitment start date
2021-11-22, 1400/09/01

Actual recruitment end date
2022-01-17, 1400/10/27
Trial completion date
2022-04-09, 1401/01/20

Scientific title
The effect of neuromuscular training with neurocognitive training on selected psychological, functional and biomechanical factors in male athletes with anterior cruciate ligament reconstruction

Public title
The effect of neurocognitive training on rehabilitation of male athletes with anterior cruciate ligament reconstruction
Purpose
Supportive
Inclusion/Exclusion criteria
Inclusion criteria:
Aged between 18-30 All patients who have first performed anterior cruciate ligament restoration using hamstring auto grafting method Passing 6 to 9 months after the surgery Having completed physiotherapy course Having at least 2 years of experience in the fields of Handball, Basketball, Football and Volleyball in the provincial level No swelling and pain in the knee Lack of lower limb abnormalities
Exclusion criteria:
Hearing and vision problems Balance problems Participation in any rehabilitation program for anterior cruciate ligament
Age
From **18 years** old to **30 years** old
Gender
Male

Phase
N/A
Groups that have been masked

- Outcome assessor

Sample size
Target sample size: **45**
Actual sample size reached: **45**
Randomization (investigator's opinion)
Randomized
Randomization description
Patients will be randomly assigned to 1 of 3 groups, the samples will be determined in a simple random method using a random number table of Random Allocation software. Randomization and allocation sequence for concealment will be done by the person not involved in the research. The ratio of sample allocation will be 1: 1 and will be divided into 2 experimental groups and 1 control group.
Blinding (investigator's opinion)
Single blinded
Blinding description
Outcome assessor is kept blind. The assessor was blinded to the group allocation.
Placebo
Not used
Assignment
Parallel
Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee
Name of ethics committee
Ethics Committee of Sports Science Research Institute
Street address
No. 3, 5th Alley, Miremad Street, Motahhari Street, Tehran, Iran.
City
Tehran
Province
Tehran
Postal code
1587958711
Approval date
2021-06-21, 1400/03/31
Ethics committee reference number
IR.SSRC.REC.1400.065

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 knee valgus angle during landing
Timepoint
Before the intervention and the end of the intervention
Method of measurement
Motion analysis system

Secondary outcomes

1

Description
Psychological readiness
Timepoint
Before the intervention and the end of the intervention
Method of measurement
Anterior Cruciate Ligament Return - To - Sport after

Injury

2

Description
Torque of the lower limb joints during landing
Timepoint
Before the intervention and the end of the intervention
Method of measurement
Motion analysis system and force plate

3

Description
Coordination and Coordination Variability
Timepoint
Before the intervention and the end of the intervention
Method of measurement
Motion analysis system

Intervention groups

1

Description
Intervention group 1: Performing neuromuscular training including single-legged exercises (single-legged hop and anterior progressions), posterior chain activation exercises (Romanian dead lift and lunge progressions), bilateral jumping exercises (double-legged jump progression), and core stability and trunk strengthening exercises (prone trunk stability and lateral trunk flexion progressions) with the use of tools such as Traband, Busobal, balance board during eight weeks, each week for two sessions (each session approximately 60 minutes).
Category
Rehabilitation

2

Description
Intervention group B: Performing neuromuscular training with cognitive and visual challenges such as counting numbers backwards, looking back and forth while performing neuromuscular training (single-legged exercises (single-legged hop and anterior progressions), posterior chain activation exercises (Romanian dead lift and lunge progressions), bilateral jumping exercises (double-legged jump progression), and core stability and trunk strengthening exercises (prone trunk stability and lateral trunk flexion progressions) with the use of tools such as Traband, Busobal, balance board) during eight weeks, each week for two sessions (each session approximately 60 minutes). The base movement is first done alone and then becomes more difficult by the addition of a single visual or cognitive task.
Category
Rehabilitation

3

Description
Control group: The control group is without any training intervention and they will just do their usual exercise program.
Category
N/A

Recruitment centers

1

Recruitment center
Name of recruitment center
Iran Novin Physiotherapy Clinic
Full name of responsible person
Mehdi Amini
Street address
No. 350, Taleghani St., in front of Kayhani School., Nemat Abad
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Kharazmi University
Full name of responsible person
Jamshid Shanbehzadeh
Street address
No. 43,Khaghani Street, Shahid Mofatteh Ave
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Tehran
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Postal code
15719-14911
Phone
+98 21 8607 0779
Email
jamshid@khu.ac.ir
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Kharazmi University
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

Kharazmi University

Full name of responsible person

Hossein Tajdini

Position

Ph.D Student

Latest degree

Master

Other areas of specialty/work

Sports Science

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Sharing plan

Deidentified Individual Participant Data Set (IPD)

No - There is not a plan to make this available

Justification/reason for indecision/not sharing IPD

There is no further information

Study Protocol

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

Statistical Analysis Plan

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

Informed Consent Form

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

Clinical Study Report

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

Analytic Code

No - There is not a plan to make this available

Data Dictionary

No - There is not a plan to make this available