

Clinical Trial Protocol

Iranian Registry of Clinical Trials

17 Jul 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

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Hossein Tajdini

Name of organization / entity

Kharazmi University

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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

AgeFrom **18 years** old to **30 years** old**Gender**

Male

Phase

N/A

Groups that have been masked

- Outcome assessor

Sample sizeTarget 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

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No. 3, 5th Alley, Miremad Street, Motahhari Street, Tehran, Iran.

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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

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No. 350, Taleghani St., in front of Kayhani School.,
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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Kharazmi University

Full name of responsible person

Jamshid Shanbehzadeh

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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

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

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Person responsible for general inquiries

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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