Clinical Trial Protocol
Iranian Registry of Clinical Trials

09 Nov 2026

The Effect of Neuromuscular Exercises on Balance, Performance, and Jump-Landing Patterns in Adolescent Female Soccer Players with Dynamic Knee Valgus

Protocol summary

Study aim
To evaluate the effect of neuromuscular exercises on balance, performance, and jump landing pattern in adolescent female soccer players with dynamic knee valgus

Design
A randomized, controlled, parallel group, single blind clinical trial in 40 participants; study phase is not applicable; simple randomization will be performed using random numbers generated in Microsoft Excel.

Settings and conduct
The study will be conducted in adolescent female soccer players in Babol. Assessments will be performed before and after the intervention. The assessor and data analyst will be blinded to group allocation.

Participants/Inclusion and exclusion criteria
Female soccer players aged 14 to 17 years with at least 3 years of training and dynamic knee valgus; lower limb injury or surgery, neurological or musculoskeletal disorders, and medications affecting balance will be exclusion criteria.

Intervention groups
The intervention group will receive neuromuscular exercises; the control group will continue usual training.

Main outcome variables
Landing Error Scoring System score; lower extremity dynamic balance in the Y Balance Test; lower extremity performance in the single leg triple hop test, lateral hop test, and figure of 8 hop test.

General information

Reason for update

Acronym

IRCT registration information
IRCT registration number: **IRCT20180521039762N8**
Registration date: **2026-07-22, 1405/04/31**
Registration timing: **prospective**

Last update: **2026-07-22, 1405/04/31**
Update count: **0**

Registration date
2026-07-22, 1405/04/31

Registrant information
Name
Afshin Moghadasi
Name of organization / entity
University of Isfahan
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Iran (Islamic Republic of)
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Recruitment status
Recruitment complete

Funding source

Expected recruitment start date
2026-08-23, 1405/06/01

Expected recruitment end date
2026-09-21, 1405/06/30

Actual recruitment start date
empty

Actual recruitment end date
empty

Trial completion date
empty

Scientific title
The Effect of Neuromuscular Exercises on Balance, Performance, and Jump-Landing Patterns in Adolescent Female Soccer Players with Dynamic Knee Valgus

Public title

Effect of Neuromuscular Exercises on Balance and Performance in Adolescent Female Soccer Players with Dynamic Knee Valgus

Purpose

Supportive

Inclusion/Exclusion criteria

Inclusion criteria:

Female sex Age 14 to 17 years Active membership in a soccer team and regular participation in training sessions At least 3 years of regular soccer training experience Presence of dynamic knee valgus based on the Landing Error Scoring System screening test

Exclusion criteria:

History of acute or chronic injury in the lower extremities, pelvis, or spine during the past 6 months History of surgery affecting the lower extremities, especially anterior cruciate ligament surgery Presence of known neurological, musculoskeletal, or balance disorders Use of medications that affect balance or motor performance

Age

From **14 years** old to **17 years** old

Gender

Female

Phase

N/A

Groups that have been masked

- Outcome assessor
- Data analyser

Sample size

Target sample size: **40**

Randomization (investigator's opinion)

Randomized

Randomization description

After the initial screening and confirmation of the eligibility criteria, 40 eligible female soccer players will be enrolled in the study. Randomization will be performed using a simple individual-level method. The random allocation sequence will be generated using the random number generation function in Microsoft Excel. A random number will be assigned to each participant, and the participants will then be sorted in ascending order based on these numbers. They will subsequently be allocated in a 1:1 ratio to the neuromuscular exercise group and the control group. Group allocation will be performed after completion of the baseline assessments. The random sequence will be kept concealed until the final allocation.

Blinding (investigator's opinion)

Single blinded

Blinding description

Because of the nature of the exercise intervention, blinding of the participants will not be possible. However, the assessors of the functional and biomechanical tests and the statistical data analyst will be blinded to group allocation. This approach will be used to reduce measurement and analysis bias.

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Research Ethics Committees of Payame Noor University

Street address

Payame Noor University, Nakhl St., Artesh Blvd., Tehran, Iran

City

Tehran

Province

Tehran

Postal code

193954697

Approval date

2021-10-27, 1400/08/05

Ethics committee reference number

IR.PNU.REC.1400.194

Health conditions studied

1

Description of health condition studied

Dynamic knee valgus

ICD-10 code

M21.0

ICD-10 code description

Valgus deformity

Primary outcomes

1

Description

Landing error pattern score

Timepoint

Before the intervention (baseline) and immediately after the intervention (8th week)

Method of measurement

Analysis of recorded landing videos based on the Landing Error Scoring System

2

Description

Lower extremity dynamic balance

Timepoint

Before the intervention (baseline) and immediately after the intervention (8th week)

Method of measurement

Measuring the reach distance in different directions using

the Lower Quarter Y Balance Test

3

Description
Lower extremity functional performance in hop tests
Timepoint
Before the intervention (baseline) and immediately after the intervention (8th week)
Method of measurement
Recording hop distance or trial time in the single leg triple hop test, lateral hop test, and figure of eight hop test using a tape measure and stopwatch

Secondary outcomes

1

Description
Not applicable
Timepoint
Not applicable
Method of measurement
Not applicable

Intervention groups

1

Description
Intervention group: Implementation of a neuromuscular training protocol focusing on improving motor control, balance, and landing pattern modification. The training will be performed for 8 weeks, 3 sessions per week, with each session lasting 40 to 50 minutes under direct supervision. The training program consists of the following components: warm-up (5 to 10 minutes of light running and dynamic stretching), proprioception and balance exercises (15 minutes on stable and unstable surfaces), plyometric and landing modification exercises (15 minutes of various jumps with emphasis on proper knee alignment and soft landing), core and hip stabilizer strengthening exercises (10 minutes), and cool-down (5 minutes of static stretching).
Category
Rehabilitation

2

Description
Control group: Subjects in this group will not receive any additional training or exercise intervention outside of their daily routine and regular soccer team training during the 8-week study period, and will only continue their routine sports activities.
Category
N/A

Recruitment centers

1

Recruitment center
Name of recruitment center
Soccer Clubs and Schools of Babol City
Full name of responsible person
Fatemeh Mohammadpour
Street address
Babol Football Association, Next to Roozbehan University, 1st Kilometer of Farahabad Road, Babol
City
Babol
Province
Mazandaran
Postal code
4816966854
Phone
+98 11 3370 0392
Email
info@mazandaranfootball.ir
Web page address
https://mazandaranfootball.ir

Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Payame Noor University
Full name of responsible person
Dr. Majid Zamahni
Street address
Payame Noor University, Nakhl St, Artesh Blvd, Tehran
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Postal code
193954697
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zamahani@pnu.ac.ir
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Payame Noor 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
Payame Noor University

Full name of responsible person
Afshin Moghadasi

Position
Assistant professor

Latest degree
Ph.D.

Other areas of specialty/work
Sports Injury and Corrective Exercises

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Person responsible for updating data

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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
Due to the confidentiality of the adolescent participants' personal data and to comply with research ethics principles, individual participant data will not be shared.

Study Protocol
Yes - There is a plan to make this available

Statistical Analysis Plan
Not applicable

Informed Consent Form
No - There is not a plan to make this available

Clinical Study Report
Yes - There is a plan to make this available

Analytic Code
Not applicable

Data Dictionary
Not applicable

Title and more details about the data/document
The full study protocol, including details of the neuromuscular exercises, implementation, and session scheduling, will be published as part of the final journal article.

When the data will become available and for how long
Access to the protocol will be available immediately after the acceptance and publication of the final article in the scientific journal.

To whom data/document is available
Researchers, sports science specialists, and the general public interested in this research area.

Under which criteria data/document could be used
The protocol can be used for similar research, adaptation of exercises, and scientific citation with proper acknowledgment.

From where data/document is obtainable
To obtain the protocol, the published article can be accessed, or correspondence can be made with the corresponding author via email: moghadasi@pnu.ac.ir

What processes are involved for a request to access

data/document

Direct requests sent to the corresponding author will be reviewed and answered within a maximum of two weeks.

Comments