Clinical Trial Protocol
Iranian Registry of Clinical Trials

09 Nov 2026

The Effect of a Gymnastics-Specific Injury Prevention Program on Balance, Muscle Strength, Range of Motion, and Flexibility in Female Artistic Gymnasts with High and Low Injury Risk

Protocol summary

Study aim

To assess the effects of an injury prevention program on balance, strength, range of motion, and flexibility.

Design

A quasi-experimental pretest-posttest controlled study with parallel groups will be conducted on 56 female artistic gymnasts aged 13–17 years. Participants will be randomly allocated to intervention and control groups after FMS screening. The study is unblinded and not applicable to clinical trial phases.

Settings and conduct

This study will be conducted on female gymnasts aged 13 to 17 in gymnastics clubs in Kerman. Following screening using the FMS test, subjects will be classified based on injury risk level and randomly assigned to either an intervention group or a control group. Assessments of dynamic balance, muscle strength, range of motion, and flexibility will be performed at both pre-test and post-test stages. The intervention group will undergo a gymnastics-specific injury prevention program—consisting of three sessions per week—for eight weeks, while the control group will continue with their routine training. The study will be conducted without blinding.

Participants/Inclusion and exclusion criteria

Female gymnasts aged 13–17 years with ≥2 years of training, no active injury, and high or low injury risk based on FMS. Exclusion: >2 absences, disabling injury, or withdrawal.

Intervention groups

Intervention group: 8-week artistic gymnastics-specific injury prevention program, 3 sessions/week, 20 min/session, alongside regular training. Control group: Regular gymnastics training without the injury prevention program.

Main outcome variables

Dynamic balance; muscular strength; range of motion; flexibility

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20260727070378N1**
Registration date: **2026-10-05, 1405/07/13**
Registration timing: **retrospective**

Last update: **2026-10-05, 1405/07/13**
Update count: **0**

Registration date

2026-10-05, 1405/07/13

Registrant information

Name

Hadis Poshteshirani

Name of organization / entity

The University of shahid bahonar kerman

Country

Iran (Islamic Republic of)

Phone

+98 34 3275 4431

Email address

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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2026-05-08, 1405/02/18

Expected recruitment end date

2026-05-18, 1405/02/28

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

The Effect of a Gymnastics-Specific Injury Prevention Program on Balance, Muscle Strength, Range of Motion, and Flexibility in Female Artistic Gymnasts with High and Low Injury Risk

Public title

The Effect of a Gymnastics-Specific Injury Prevention Program on Balance, Muscle Strength, Range of Motion, and Flexibility in Female Artistic Gymnasts with High and Low Injury Risk

Purpose

Prevention

Inclusion/Exclusion criteria

Inclusion criteria:

• Female gymnasts aged 13–17 •At least two years of regular artistic gymnastics training experience •Good general health and absence of active lower-limb or spinal injuries •No history of lower-limb or spinal surgery within the past two years • Willingness to participate in the study and commitment to regular attendance at training sessions and assessments. • Classification into either the high-risk or low-risk category for injury based on FMS screening results.

Exclusion criteria:

•Failure to adhere to the training program (absence exceeding two sessions) •Occurrence of an injury during the study that prevents the continuation of activities

Age

From **13 years** old to **17 years** old

Gender

Female

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **56**

Randomization (investigator's opinion)

Randomized

Randomization description

Eligible individuals are categorized into high-risk and low-risk groups based on their FMS test results. Subsequently, participants are randomly assigned to either an experimental group or a control group, with each group comprising 24 individuals—12 classified as high-risk and 12 as low-risk.

Blinding (investigator's opinion)

Not blinded

Blinding description

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Ethics Committee of Kerman University of Medical Sciences

Street address

Kerman, beginning of Haft-Bagh-e Alavi Boulevard – University of Medical Sciences Campus

City

Kerman

Province

Kerman

Postal code

7616913555

Approval date

2026-07-25, 1405/05/03

Ethics committee reference number

IR.KMU.REC.1405.147

Health conditions studied

1

Description of health condition studied

Artistic gymnastics injury prevention

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description

Dynamic balance

Timepoint

At baseline before the intervention and after 8 weeks of intervention

Method of measurement

Y-Balance Test including anterior, posteromedial, and posterolateral reach directions, with the best performance recorded from three trials

2

Description

Muscle strength

Timepoint

At baseline before the intervention and after 8 weeks of intervention

Method of measurement

Handheld dynamometer for measuring quadriceps, hamstring, and gluteus medius muscle strength, using three 5-second trials

3

Description
Lower-limb joint range of motion
Timepoint
At baseline before the intervention and after 8 weeks of intervention
Method of measurement
Modified Thomas Test for hip joint range of motion and Weight-Bearing Lunge Test for ankle range of motion, measuring the distance from the great toe to the wall in centimeter

4

Description
Lower-limb muscle flexibility
Timepoint
At baseline before the intervention and after 8 weeks of intervention
Method of measurement
Straight Leg Raise Test for measuring hamstring muscle flexibility

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group: Implementation of an artistic gymnastics-specific injury prevention program for 8 weeks—three sessions per week, lasting approximately 20 minutes each—alongside routine gymnastics training. The program will be administered progressively, moving from simple to advanced exercises, and will include muscle strengthening, balance, neuromuscular control, and flexibility exercises.
Category
Prevention

2

Description
Control group: Usual gymnastics training for 8 weeks without the injury prevention program
Category
N/A

Recruitment centers

1

Recruitment center
Name of recruitment center
پویش
Full name of responsible person
Mohammad Mehrtash
Street address
Mo'afi Street, Pezeshk Street, Alley No. 9
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Email
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Shahid Bahonar University of Kerman
Full name of responsible person
Saeid Bahiraei
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Shahid Bahonar University, Pajoohesh Square, Imam Khomeini Highway, Kerman, Iran
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Postal code
7616914111
Phone
+98 911 829 1048
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s.bahiraei@uk.ac.ir
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Shahid Bahonar University of Kerman
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 Bahonar University of Kerman
Full name of responsible person
Hadis Poshtehshirani
Position
M.Sc. Student
Latest degree

Bachelor

Other areas of specialty/work
Sports Injury and Corrective Exercise

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Assistant Professor

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Latest degree
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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 considerations regarding the confidentiality and protection of participants' information, there are no plans to share individual participant data from this study.

Study Protocol
No - There is not a plan to make this available

Statistical Analysis Plan
No - There is not a plan to make this available

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

Clinical Study Report
No - There is not 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