

Clinical Trial Protocol

Iranian Registry of Clinical Trials

10 Jun 2026

Comparison of the effect of eccentric and concentric biased exercises on foot posture and balance in individuals with flatfoot

Protocol summary

Study aim

The purpose of this study is comparing the effect of eccentric and concentric biased exercises on foot posture and balance in individuals with flatfoot

Design

A clinical trial with the control group, with parallel groups, randomized

Settings and conduct

First, the subjects will be selected based on the inclusion and exclusion criteria of the study, and after completing the personal information form and consent form, they will be divided into three groups: two experimental groups and a control group, all of whom have flexible flatfoot. First, a pre-test will be taken from all subjects, then the experimental groups will perform eccentric and concentric biased exercises, while the control group will only perform daily activities. The experimental groups will perform the exercises for 6 weeks, three days a week, each session for 20-40 minutes.

Participants/Inclusion and exclusion criteria

The inclusion criteria: being female, having a flexible flatfoot, having a navicular drop of more than 10 millimeters, and having a body mass index (BMI) between 18 and 25. The exclusion: a history of injury, fracture, or surgery in the lower extremities, non-participation in two consecutive training sessions, and engaging in activities outside the participants' training program.

Intervention groups

In eccentric biased exercises, the emphasis is on the eccentric phase, while in concentric exercises, the emphasis is on the concentric phase. The exercises used in this study included heel raises, the short foot exercise, and great toe (hallux) flexion.

Main outcome variables

Navicular Drop index, Y balance Test, Stork balance test

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20180626040244N8**

Registration date: **2025-09-04, 1404/06/13**

Registration timing: **registered_while_recruiting**

Last update: **2025-09-04, 1404/06/13**

Update count: **0**

Registration date

2025-09-04, 1404/06/13

Registrant information

Name

Rahman Sheikhhoseini

Name of organization / entity

Allameh Tabataba'i University

Country

Iran (Islamic Republic of)

Phone

+98 21 4839 4134

Email address

rahmanhoseini@atu.ac.ir

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2025-09-01, 1404/06/10

Expected recruitment end date

2025-09-23, 1404/07/01

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Comparison of the effect of eccentric and concentric biased exercises on foot posture and balance in individuals with flatfoot

Public title

Effectiveness of Eccentric and Concentric-Biased Exercises on flatfoot

Purpose

Prevention

Inclusion/Exclusion criteria**Inclusion criteria:**

Being in the age group of 11 to 15 years having a flexible flatfoot having a body mass index (BMI) between 18 and 25

Exclusion criteria:**Age**

From **11 years** old to **15 years** old

Gender

Female

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **45**

Randomization (investigator's opinion)

Randomized

Randomization description

The simple randomization method, using sealed envelopes, is employed to assign participants to different groups. Each intervention type is written on a card and placed in a sealed envelope. Participants are listed in the order of their enrollment in the study. After each participant is enrolled, the envelopes are shuffled randomly, and each participant is asked to select one envelope at random. The number of envelopes is determined based on the expected sample size, ensuring that each selected envelope is not re-entered into the randomization process. This method ensures that the number of participants in each experimental group is approximately equal, thereby reducing the risk of discrepancies in group sizes.

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 Allameh Tabataba'i University

Street address

West Azadi sports complex entrance, Hakim highway

City

Tehran

Province

Tehran

Postal code

1485743411

Approval date

2023-11-01, 1402/08/10

Ethics committee reference number

IR.ATU.REC.1402.082

Health conditions studied**1****Description of health condition studied**

Flexible Flatfoot

ICD-10 code

Q66.5

ICD-10 code description

Congenital pes planus

Primary outcomes**1****Description**

Navicular drop

Timepoint

Before the study starts and after 6 weeks of exercise intervention

Method of measurement

Navicular drop index

2**Description**

Static balance

Timepoint

Before the study starts and after 6 weeks of exercise intervention

Method of measurement

Stork balance test

3**Description**

Dynamic balance

Timepoint

Before the study starts and after 6 weeks of exercise intervention

Method of measurement

Y balance test

Secondary outcomes

empty

Intervention groups

1

Description

Intervention group: The eccentric/concentric-biased groups will perform the exercises for six weeks, three days per week, each lasting 20 to 40 minutes. A warm-up period of 5–10 minutes will be conducted before each session, followed by a 5–10-minute cool-down after the exercises. In eccentric-biased training, the emphasis will be on the eccentric phase of the exercises, whereas in concentric-biased training, the focus will be on the concentric phase. The exercises included in this study are heel raises, the short foot exercise, and great toe (hallux) flexion. The tempo for eccentric-biased exercises will be set at 2-0-4, while for concentric-biased exercises, it will be 4-0-2. Exercise progression will follow a structured sequence, starting from a seated position, advancing to a standing position with both feet and finally to a single-leg standing position.

Category

Prevention

2

Description

Control group: The control group did not receive any intervention during this period and continued with their routine daily activities.

Category

Prevention

Recruitment centers

1

Recruitment center

Name of recruitment center

Faculty of physical education and sport sciences

Full name of responsible person

Rahman Sheikhhoseini

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Allameh Tabataba'i University

Full name of responsible person

Dr Gholamali Karegar

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Grant name

Grant code / Reference number

Is the source of funding the same sponsor organization/entity?

No

Title of funding source

Allameh Tabataba'i 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

Allameh Tabataba'i University

Full name of responsible person

Rahman Sheikhhoseini

Position

Associate professor

Latest degree

Ph.D.

Other areas of specialty/work

Physiotherapy

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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

Yes - There is a plan to make this available

Title and more details about the data/document

After the article is published, raw data without identifying the participants will be available by email to the corresponding author of the article.

When the data will become available and for how long

After the article is published, raw data without identifying the participants will be available by email to the corresponding author of the article.

To whom data/document is available

Any author who needs raw data, with a reason

Under which criteria data/document could be used

Any researcher can request data.

From where data/document is obtainable

By email to the correspondence author

What processes are involved for a request to access data/document

By email to the correspondence author

Comments