Clinical Trial Protocol
Iranian Registry of Clinical Trials

22 Nov 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
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Iran (Islamic Republic of)
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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
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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 physiscal educationa and sport scienecs

Full name of responsible person
Rahman Sheikhhoseini

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity
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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