Clinical Trial Protocol
Iranian Registry of Clinical Trials

17 Sep 2026

The effect of Pilates exercises on proprioception and balance in students with and without flexible flat foot

Protocol summary

Study aim
The purpose of this study is to investigate the effect of Pilates exercises on balance and proprioception sense in female students with and without flexible flatfoot.
Design
This trial will be conducted on 100 students with two intervention groups (flexible flatfoot and normal foot).
Settings and conduct
This research will be conducted in the Faculty of Physical Education of Kharazmi University. For this purpose, 100 available students aged 18-24 years old will be placed in two intervention groups (group with and without flexible flatfoot). The pre-test will be performed. Then, training will be performed for 16 weeks. Then the post-test will be done.
Participants/Inclusion and exclusion criteria
Inclusion criteria: Students with and without flexible flatfoot between 18 and 24 years of age will be included in intervention groups 1 and 2. Exclusion criteria: Students with regular sports activities will not participate in the study.
Intervention groups
Intervention group 1 and 2 (students with and without flexible flatfoot) will receive Pilates exercises for 16 weeks.
Main outcome variables
Static balance, knee and ankle joint position sense.

General information

Reason for update
Acronym
IRCT registration information
IRCT registration number: **IRCT20130109012078N6**
Registration date: **2022-11-18, 1401/08/27**
Registration timing: **prospective**

Last update: **2022-11-18, 1401/08/27**
Update count: **0**
Registration date
2022-11-18, 1401/08/27

Registrant information
Name
Maryam Ghorbani
Name of organization / entity
Azad
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Recruitment status
Recruitment complete
Funding source

Expected recruitment start date
2023-01-20, 1401/10/30
Expected recruitment end date
2023-06-19, 1402/03/29
Actual recruitment start date
empty
Actual recruitment end date
empty
Trial completion date
empty

Scientific title
The effect of Pilates exercises on proprioception and balance in students with and without flexible flat foot

Public title
Investigating the effect of Pilates exercises on proprioception
Purpose
Supportive
Inclusion/Exclusion criteria
Inclusion criteria:

Female students in the age range of 18-24 years The health of the nervous, skeletal and muscular system (except for the deformity of flexible flatfoot) The health of the cardiovascular system, respiratory system, etc.
Exclusion criteria:
Suffering from structural flatfoot Having regular sports activities People who have a history of neurological, rheumatism, metabolic diseases, mental disorders, disorders in the vestibular system, a history of balance disorders and frequent dizziness

Age
From **18 years** old to **24 years** old

Gender
Female

Phase
N/A

Groups that have been masked
No information

Sample size
Target sample size: **100**

Randomization (investigator's opinion)
Not randomized

Randomization description

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 in Research of Sports Science Research Institute

Street address
No. Mir Emad St. 5th Alley . Ostad Motahhari St. Tehran

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Approval date
2022-10-22, 1401/07/30

Ethics committee reference number
IR.SSRC.REC.1401.071

Health conditions studied

1

Description of health condition studied
flatfoot

ICD-10 code
M21.4

ICD-10 code description
Flat foot [pes planus] (acquired)

Primary outcomes

1

Description
static balance

Timepoint
Measurements will be performed before and after the training intervention

Method of measurement
Sharpened-Romberg test will be used to evaluate static balance. For this purpose, the subject will stand without shoes on a flat surface and places the dominant foot in tandem position in front of the non-dominant foot; hands will be crossed on the chest. This test will be performed with closed eyes. The time that a person will be able to maintain the posture before the balance is disturbed will be considered as a person's score.

2

Description
knee and ankle joint position sense

Timepoint
Measurements will be performed before and after the training intervention

Method of measurement
In order to measure the position sense of the ankle and knee joints, the ankle and knee angle active reconstruction test will be used. A goniometer will be used during reconstruction of desired angles.

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group 1 (with flexible flatfoot): Pilates exercises. In the exercise program based on Pilates, each session of the exercises suitable for the prerequisites and levels 4 and 3 of Pilates, which is for beginners, will be performed for 80 minutes. -Training period: sixteen weeks. -Number of training sessions per week: one session per week. -The duration of each training session: 90 minutes (5 minutes of warm-up, 80 minutes of the main body of the class, 5 minutes of cool-down) in each session.

Category
Rehabilitation

2

Description
Intervention group 2 (with normal foot): Pilates exercises. In the exercise program based on Pilates, each session of the exercises suitable for the prerequisites and levels 4 and 3 of Pilates, which is for beginners, will be performed for 80 minutes. -Training period: sixteen weeks. -Number of training sessions per week: one session per week. -The duration of each training session: 90 minutes (5 minutes of warm-up, 80 minutes of the main body of the class, 5 minutes of cool-down) in each session.

Category
Prevention

Recruitment centers

1

Recruitment center

Name of recruitment center
Shahid Bahonar Higher Education Center of Tehran

Full name of responsible person
Maryam Ghorbani

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Sponsors / Funding sources

1

Sponsor

Name of organization / entity
kharazmi University

Full name of responsible person
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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

Person responsible for general inquiries

Contact

Name of organization / entity
kharazmi University

Full name of responsible person
Maryam Ghorbani

Position
student

Latest degree
Master

Other areas of specialty/work
motor behavior

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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
Not applicable
Data Dictionary
Not applicable
Title and more details about the data/document
Data related to static balance and sense of knee and ankle joint position before and after the intervention will be provided to the audience.
When the data will become available and for how long
September 2023.
To whom data/document is available
Students and university professors
Under which criteria data/document could be used
This trial will be published in the form of an academic project.
From where data/document is obtainable
One should refer to the library of Kharazmi University.
What processes are involved for a request to access data/document
Students will go to the library and receive the file from the librarian.
Comments