Clinical Trial Protocol
Iranian Registry of Clinical Trials

10 Jun 2026

The effect of combined bodyweight strength training on dynamic balance, muscle strength, functional movement stability, and fall risk in older adults in

Protocol summary

Study aim

To evaluate the effects of a combined bodyweight strength training program on dynamic balance, muscle strength, functional movement stability, and fall risk in older adults.

Design

A randomized controlled clinical trial with parallel groups, single-blind (assessor-blinded), conducted in 40 participants

Settings and conduct

The study is conducted at Semnan University of Medical Sciences. After recruitment and screening, participants are randomly allocated to intervention and control groups. Baseline and post-intervention assessments are performed at the university setting. The exercise intervention is implemented over 8 weeks. Outcome assessments are conducted by a trained assessor blinded to group allocation.

Participants/Inclusion and exclusion criteria

Inclusion criteria: Age 60 years and older; residence in Semnan city; ability to walk independently (with or without assistive devices); no severe medical conditions limiting physical activity; no cognitive impairment affecting understanding or performing exercise instructions; no participation in any regular or structured exercise program during the past six months; provision of written informed consent. Exclusion criteria: Any medical contraindication to physical activity; history of lower-limb or spinal orthopedic surgery affecting balance or gait.

Intervention groups

Intervention group: Combined bodyweight strength training for 8 weeks, 2 sessions per week (≥ 48 hours between sessions), 60 minutes per session, supervised by the researcher; including 5–10 min warm-up, lower-limb and core strength exercises with progressive overload, and 5–10 min cool-down. Control group: No structured exercise intervention; continuation of usual daily activities throughout the study period.

Main outcome variables

Static balance (force plate); dynamic balance (10-m walk); knee muscle strength (peak torque, Biodex); gait stability (gait parameters).

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20251214068338N1**
Registration date: **2026-02-06, 1404/11/17**
Registration timing: **retrospective**

Last update: **2026-02-06, 1404/11/17**
Update count: **0**

Registration date

2026-02-06, 1404/11/17

Registrant information

Name

Bahar Jafari

Name of organization / entity

Country

Iran (Islamic Republic of)

Phone

+98 999 181 5566

Email address

bhrjfri@gmail.com

Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2026-01-06, 1404/10/16

Expected recruitment end date

2026-01-10, 1404/10/20

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

The effect of combined bodyweight strength training on dynamic balance, muscle strength, functional movement stability, and fall risk in older adults in

Public title

Bodyweight exercise for fall prevention in older adults

Purpose

Supportive

Inclusion/Exclusion criteria

Inclusion criteria:

Age ≥ 60 years Ability to walk independently (with or without assistive devices) No history of acute cardiovascular disease, neurological, neuromuscular, or orthopedic conditions that would preclude participation in physical activity No severe cognitive impairment that would interfere with understanding or performing exercise instructions No participation in any regular or structured exercise program within the past six months

Exclusion criteria:

Any medical contraindication to physical activity or lack of medical clearance to participate. History of lower-limb or spinal orthopedic surgery affecting balance or gait.

Age

From **60 years** old

Gender

Both

Phase

N/A

Groups that have been masked

- Outcome assessor

Sample size

Target sample size: **40**

Randomization (investigator's opinion)

Randomized

Randomization description

The unit of randomization in this study is the individual. After initial screening, confirmation of eligibility, and obtaining written informed consent, participants are randomly allocated to the intervention and control groups. Participants are assigned to the intervention and control groups using block randomization with a fixed block size of 4 and a 1:1 allocation ratio. The random allocation sequence is generated by an independent researcher using SPSS software (version 26). To ensure allocation concealment, the allocation sequence is placed in sequentially numbered, opaque, sealed envelopes. After final enrollment of each participant, the corresponding envelope is opened in numerical order and the group assignment is revealed. Random sequence generation and group allocation are performed by a researcher independent of the intervention delivery and outcome assessment.

Blinding (investigator's opinion)

Single blinded

Blinding description

This study will be conducted as a single-blind trial, in which the outcome assessors will be blinded to group allocation. Due to the nature of the exercise intervention, blinding of participants and intervention providers is not feasible.

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Research Ethics Committee of Allameh Tabataba'i University

Street address

Allameh Tabataba'i University (Central Campus), Dehkadeh Olympic Blvd., Shahid Hemmat Expressway Intersection Tehran, Iran

City

Tehran

Province

Tehran

Postal code

1489683991

Approval date

2025-12-13, 1404/09/22

Ethics committee reference number

IR.ATU.REC.1404.144

Health conditions studied

1

Description of health condition studied

Balance impairment and functional mobility limitation in older adults

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description

Static balance

Timepoint

Outcome measures are assessed at two time points: 1. Baseline (pre-intervention) 2. Post-intervention (after completion of the 8-week training program)

Method of measurement

Static balance is measured using the Single-Leg Stance Test, assessed with a Force Plate.

2

Description
Dynamic balance
Timepoint
Outcome measures are assessed at two time points: 1. Baseline (pre-intervention) 2. Post-intervention (after completion of the 8-week training program)
Method of measurement
Dynamic balance is evaluated using the 10-Meter Walk Test, assessed with a Force Plate.

3

Description
lower-limb muscle strength
Timepoint
Outcome measures are assessed at two time points: 1. Baseline (pre-intervention) 2. Post-intervention (after completion of the 8-week training program)
Method of measurement
Muscle strength of the knee flexor and extensor muscles is measured using a Biodex System 3 isokinetic dynamometer.

4

Description
functional movement stability
Timepoint
Outcome measures are assessed at two time points: 1. Baseline (pre-intervention) 2. Post-intervention (after completion of the 8-week training program)
Method of measurement
.Functional movement stability is assessed using a motion analysis system during the performance of the 10-Meter Walk Test

Secondary outcomes

1

Description
Fall risk
Timepoint
Outcome measures are assessed at two time points: 1. Baseline (pre-intervention) 2. Post-intervention (after completion of the8-week training program)
Method of measurement
Falls Efficacy Scale–International (FES-I)

Intervention groups

1

Description
Intervention group: Participants in the intervention group will take part in a combined bodyweight strength training program. The program will be conducted for 8 weeks, with two sessions per week, and each session will last approximately 60 minutes.The training intervention focuses on strengthening the lower limb and core muscles and is designed to improve functional abilities related to balance and movement stability.Each training session consists of three components: 1. Warm-up (approximately 10 minutes), including light activities and stretching exercises; 2. Main training phase (approximately 40 minutes), consisting of bodyweight strength exercises targeting the lower limbs and core muscles, as well as functional balance-related exercises; 3. Cool-down (approximately 10 minutes), including gentle stretching exercises.Training sessions are delivered according to a structured exercise program and are performed in a group-based format. Exercise intensity and difficulty are progressively adjusted according to participants' abilities. All exercises are conducted with careful consideration of older adults' safety, and all training sessions are carried out under the direct supervision of the researcher or a trained instructor.
Category
Rehabilitation

2

Description
Control group:Participants in the control group do not receive any structured exercise intervention during the study period and continue their usual daily activities. No specific exercise program or physical activity recommendations are provided, and participants are instructed to maintain their habitual level of physical activity throughout the study
Category
Rehabilitation

Recruitment centers

1

Recruitment center
Name of recruitment center
Neuromuscular Rehabilitation research center
Full name of responsible person
Bahar Jafari
Street address
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Sponsors / Funding sources

1

Sponsor
Name of organization / entity
Allameh Tabataba'i University
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Dr. Mandana Tishehyar
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Allameh Tabataba'i University (Central Campus), Dehkadeh Olympic Blvd., Shahid Hemmat Expressway Intersection Tehran, Iran
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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
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
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Full name of responsible person
Bahar Jafari
Position
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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 limited sample size and the nature of functional and performance-related data in older adults, there is a potential risk of indirect participant identification. Therefore, to ensure data confidentiality and comply with ethical considerations, there is no plan to share individual participant data (IPD).
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