

Clinical Trial Protocol

Iranian Registry of Clinical Trials

11 Sep 2026

The Effects of Nordic Walking and Resistance Training on Balance and Functional Performance in Postmenopausal Women with Osteoporosis

Protocol summary

Study aim

The Effects of Nordic Walking and Resistance Training on Balance and Functional Performance in Postmenopausal Women with Osteoporosis

Design

Randomized clinical trial (RCT) with pretest-posttest and control group.

Settings and conduct

The study will be conducted at the Sports Sciences Research Institute and will be carried out without blinding.

Participants/Inclusion and exclusion criteria

Study inclusion criteria: Women aged 45 to 60 years Postmenopausal status (at least 12 months of amenorrhea) Diagnosed with osteoporosis Ability to perform exercises and participate in training sessions Referral to healthcare centers in Tehran and Karaj
Exclusion criteria: Missing more than 3 training sessions Occurrence of severe pain, injury, or medical complications during exercise Initiation of new treatment or medication affecting bone metabolism during the study Development of diseases or conditions that prevent continuation of exercise participation

Intervention groups

This study included three groups: two intervention groups and one control group. The first group was the Nordic walking group, which performed Nordic walking exercises using specialized poles for eight weeks, three sessions per week, with each session lasting 60 minutes at an intensity of 50–70% of maximum heart rate. The second group was the resistance training group, which, over the same eight-week period, performed strength training exercises three times per week at an intensity of 40–60% of one-repetition maximum (1RM), targeting the lower-limb muscles (including leg flexion and extension, rowing, butterfly, leg press, and crunch exercises). The third group was the control group, which received no exercise intervention during the study period and continued their usual daily activities.

Main outcome variables

Static balance, dynamic balance, and motor function.

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20221231056996N2**

Registration date: **2026-06-29, 1405/04/08**

Registration timing: **prospective**

Last update: **2026-06-29, 1405/04/08**

Update count: **0**

Registration date

2026-06-29, 1405/04/08

Registrant information

Name

Mohammadreza Seyedi

Name of organization / entity

Sport Sciences Research Institute

Country

Iran (Islamic Republic of)

Phone

+98 21 8874 7884

Email address

seyedi@ssrc.ac.ir

Recruitment status

recruiting

Funding source

Expected recruitment start date

2026-07-23, 1405/05/01

Expected recruitment end date

2026-09-23, 1405/07/01

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date
empty

Scientific title
The Effects of Nordic Walking and Resistance Training on Balance and Functional Performance in Postmenopausal Women with Osteoporosis

Public title
The Effects of Nordic Walking and Resistance Training on Balance and Functional Performance in Postmenopausal Women with Osteoporosis

Purpose
Supportive

Inclusion/Exclusion criteria
Inclusion criteria:
 Age range: 45 to 60 years old Being menopausal (at least 12 months without menstruation) Having osteoporosis (based on a DEXA T-score of less than -2.5 and confirmed by a specialist physician) Ability to perform exercises and participate in training sessions Participants referring to healthcare centers in the cities of Tehran and Karaj
Exclusion criteria:
 Not missing more than 3 training sessions Occurrence of severe pain, injury, or medical complications during exercise Initiation of a new treatment or medication affecting bone during the study Having diseases or medical conditions that prevent continuation of the exercise program

Age
From **45 years** old to **60 years** old

Gender
Female

Phase
N/A

Groups that have been masked
No information

Sample size
Target sample size: **39**

Randomization (investigator's opinion)
Randomized

Randomization description
In this three-group study, after confirming the eligibility criteria, participants will be randomly assigned to three groups (two experimental groups and one control group) using simple randomization with an online random number generation software (such as Random Allocation Software or Sealed Envelope). To ensure allocation concealment, the randomization results will be placed in opaque, sealed envelopes, and until the intervention begins, neither the researcher nor the participants will be aware of the group assignments.

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

Research Ethics Committee of the Sport Sciences Research Institute

Street address

Motahhari st. MirEmad 5th

City

Tehran

Province

Tehran

Postal code

1587958711

Approval date

2026-05-20, 1405/02/30

Ethics committee reference number

IR.SSRC.REC.1405.033

Health conditions studied

1

Description of health condition studied

Osteoporosis

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description

Static Balance

Timepoint

pre and post test evaluation

Method of measurement

Romberg Test

2

Description

Dynamic Balance

Timepoint

pre and post test evaluation

Method of measurement

Timed Up and Go Test (TUG)

3

Description

Physical Performance:

Timepoint

pre and post test evaluation

Method of measurement

Senior Fitness Tests

Secondary outcomes

empty

Intervention groups

1

Description

Nordic Walking Intervention Group: Participants in this group will perform Nordic walking exercises using specialized walking poles. This exercise includes coordination of arm and leg movements, maintaining proper body posture, and walking at moderate intensity, accompanied by warm-up and cool-down sessions. This group will perform Nordic walking training for 8 weeks, 3 sessions per week, with each session lasting 45 to 60 minutes.

Category

Rehabilitation

2

Description

Resistance Training Intervention Group: Participants in this group will perform strength training exercises using weights, resistance bands, and body weight. The exercises include strengthening the lower, upper, and core body muscles, such as squats, calf exercises, and exercises for the hips, arms, and shoulders. This group will perform resistance training for 8 weeks, 3 sessions per week. Each session will last 45 to 60 minutes. The exercise intensity will be approximately 50 to 70% of one-repetition maximum (1RM).

Category

Rehabilitation

3

Description

Control group: Participants in this group will not receive any exercise program and will continue their usual daily activities throughout the study period.

Category

Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center

Sports Science Research Institute

Full name of responsible person

Mohammadreza Seyedi

Street address

No. 3, 5th Alley, Mir Emad Street, Motahari Avenue,
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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Islamic Azad University

Full name of responsible person

محمد رضا سیدی

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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

Islamic Azad University

Proportion provided by this source

100

Public or private sector

Private

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

Sport Sciences Research Institute

Full name of responsible person

Mohammadreza Seyedi

Position

Assistant professor in Sport Sciences Research
Institute of IRAN

Latest degree

Ph.D.

Other areas of specialty/work

Sport medicine

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Person responsible for scientific inquiries

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Sport Sciences Research Institute
Full name of responsible person
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Person responsible for updating data

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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

Data information will be published only in the form of
articles and statistical results.

Study Protocol

Undecided - It is not yet known if there will be a plan to
make this available

Statistical Analysis Plan

Undecided - It is not yet known if there will be a plan to
make this available

Informed Consent Form

Undecided - It is not yet known if there will be a plan to
make this available

Clinical Study Report

Undecided - It is not yet known if there will be a plan to
make this available

Analytic Code

Undecided - It is not yet known if there will be a plan to
make this available

Data Dictionary

Undecided - It is not yet known if there will be a plan to
make this available