# Clinical Trial Protocol
# Iranian Registry of Clinical Trials

22 Nov 2026

## Effects of backward walking on balance, gait, functional and muscle activity in women with multiple sclerosis

## Protocol summary

**Study aim**
Investigating the effects of backward walking on balance, gait, function, and muscle activity in women with multiple sclerosis

**Design**
The current research is semi-experimental and practical and has pre-test and post-test. It has an intervention group and a control group, with parallel and unblinded groups. The statistical population will include women with MS in Arak city. Using G*power software, 30 people were selected in a purposeful and accessible manner, and then they will be randomly divided into two experimental groups (15 people) and control (15 people).

**Settings and conduct**
After completing the consent form, the pre-test including timed up and go test, dynamic gait index test, 25-foot walk test, Berg test, electromyography test is performed in the laboratory of Arak University. After 8 weeks of training, the post-test will be repeated with the same assessments. Trainings are held in the gymnasium of Arak University.

**Participants/Inclusion and exclusion criteria**
Participants: Women with multiple sclerosis in Arak Inclusion: Age 25-45, EDSS score 3-6, no cardiovascular, neurological, or orthopedic conditions Exclusion: Withdrawal from study, injury during research

**Intervention groups**
Experimental Group: Backward walking training for 8 weeks, 3 sessions per week, including moderate-intensity backward walking with rest intervals. Control Group: Forward walking training with the same frequency, intensity, and duration, without backward walking exercises

**Main outcome variables**
Balance; Gait speed; Motor performance; Muscle activity

## General information

**Reason for update**

**Acronym**

**IRCT registration information**
IRCT registration number: **IRCT20250206064672N1**
Registration date: **2025-03-24, 1404/01/04**
Registration timing: **prospective**

Last update: **2025-03-24, 1404/01/04**
Update count: **0**

**Registration date**
2025-03-24, 1404/01/04

**Registrant information**

**Name**
Faezeh Moradi

**Name of organization / entity**
Arak University

**Country**
Iran (Islamic Republic of)

**Phone**
+98 38 3426 3814

**Email address**
f.moradi.02@msc.araku.ac.ir

**Recruitment status**
**Recruitment complete**

**Funding source**

**Expected recruitment start date**
2025-04-14, 1404/01/25

**Expected recruitment end date**
2025-07-11, 1404/04/20

**Actual recruitment start date**
empty

**Actual recruitment end date**
empty

**Trial completion date**
empty

**Scientific title**
Effects of backward walking on balance, gait, functional and muscle activity in women with multiple sclerosis

**Public title**
Effects of backward walking on balance, gait, functional and muscle activity in women with multiple sclerosis
**Purpose**
Treatment
**Inclusion/Exclusion criteria**
**Inclusion criteria:**
Women with multiple sclerosis between the ages of 25-45 Expanded Disability Status Scale (EDSS) score between -3 and 6 Absence of any cardiovascular, neurological, orthopedic diseases, ear problems, etc.
**Exclusion criteria:**
If for any reason they are not willing to continue participating in the research and suffer an injury during the research that prevents them from continuing.
**Age**
From **25 years** old to **50 years** old
**Gender**
Female

**Phase**
1-2
**Groups that have been masked**
*No information*
**Sample size**
Target sample size: **30**
**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**
Arak University Ethics Committee
**Street address**
Arak University, Karbala Blvd, Basij Sq, Arak, Iran
**City**
Arak
**Province**
Markazi
**Postal code**
۳۸۴۸۱۷۷۵۸۴
**Approval date**
2025-01-08, 1403/10/19
**Ethics committee reference number**
IR.ARAKU.REC.1403.060

## Health conditions studied

### 1

**Description of health condition studied**
Multiple sclerosis
**ICD-10 code**
G35
**ICD-10 code description**
G35

## Primary outcomes

### 1

**Description**
Balance: The patient’s balance score is assessed using the Berg Balance Scale. This scale consists of 14 items that evaluate the patient’s ability to maintain balance in different positions.
**Timepoint**
At the beginning of the study and after 8 weeks of training
**Method of measurement**
Berg Balance Scale

### 2

**Description**
Gait
**Timepoint**
At the beginning of the study and after 8 weeks of training
**Method of measurement**
25-foot walk test

### 3

**Description**
Functional Activity
**Timepoint**
At the beginning of the study and after 8 weeks of training
**Method of measurement**
Dynamic Gait Index (DGI)

### 4

**Description**
Electromyography - EMG
**Timepoint**
At the beginning of the study and after 8 weeks of training
**Method of measurement**
Recording electrical signals from calf and thigh muscles during walking using EMG

## Secondary outcomes

empty

## Intervention groups

### 1

**Description**
"Intervention group:" Participants in this group will perform forward and backward walking exercises for 8 weeks, 3 sessions per week. Each session will consist of normal walking, followed by 10 minutes of rest, and then moderate-intensity backward walking exercises (14-15 on the Borg scale). The number of repetitions will vary from 3 to 10 times, with 1 to 2 minutes of rest between repetitions. The exercises will be performed under the supervision of researchers in the gymnasium of Arak University.

**Category**
Rehabilitation

### 2

**Description**
Control group: The participants of this group perform forward walking exercise for 8 weeks, 3 sessions per week. Each session consists of normal walking of moderate intensity (14-15 according to the Borg scale). The number of repetitions varies from 3 to 10 times and 1 to 2 minutes rest is considered between repetitions. Exercises are carried out under the supervision of researchers in the sports hall of Arak University.

**Category**
Rehabilitation

## Recruitment centers

### 1

**Recruitment center**

**Name of recruitment center**
Multiple Sclerosis Society

**Full name of responsible person**
Abbas Amiri

**Street address**
MS Patients Complex, Next to Yadegar-e-Imam Stadium, Farabi Street, Gerdo Town, Arak, Markazi Province, Iran

**City**
Arak

**Province**
Markazi

**Postal code**
53536-38191

**Phone**
+98 86 3279 0084

**Fax**

**Email**
info@markazi-ms.ir

## Sponsors / Funding sources

### 1

**Sponsor**

**Name of organization / entity**
Arak University

**Full name of responsible person**
Mohammad Ali Badaghifard

**Street address**
Arak University, Karbala Boulevard, Basij Square, Arak, Markazi Province, Iran

**City**
Arak

**Province**
Markazi

**Postal code**
۳۸۴۸۱۷۷۵۸۴

**Phone**
+98 86 3262 2000

**Email**
e-dabir@araku.ac.ir

**Grant name**

**Grant code / Reference number**

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

**Title of funding source**
Arak 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**
Arak University

**Full name of responsible person**
Faezeh Moradi

**Position**
Student

**Latest degree**
Bachelor

**Other areas of specialty/work**
Pathology and corrective movements

**Street address**
Karbala Boulevard, Basij Square

**City**
Arak

**Province**
Markazi

**Postal code**
۳۸۴۸۱۷۷۵۸۴

**Phone**
+98 86 3262 1042

**Email**
f.moradi.02@msc.araku.ac.ir

## Person responsible for scientific inquiries

**Contact**

**Name of organization / entity**
Arak Univercity

**Full name of responsible person**
Faezeh Moradi

**Position**
Student

**Latest degree**
Bachelor

**Other areas of specialty/work**
Pathology and corrective movements

**Street address**
Shahid Rajaee Street

**City**
Broujen

**Province**
Chahar-Mahal-va-Bakhtiari

**Postal code**
8875133731

**Phone**
+98 38 3426 3814

**Email**
f.moradi02@msc.araku.ac.ir

## Person responsible for updating data

**Contact**

**Name of organization / entity**
Arak Univercity

**Full name of responsible person**
Faezeh Moradi

**Position**
Student

**Latest degree**
Bachelor

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f.moradi.02@msc.araku.ac.ir

## Sharing plan

**Deidentified Individual Participant Data Set (IPD)**
Undecided - It is not yet known if there will be a plan to make this available

**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**
No - There is not 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**
No - There is not a plan to make this available

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