Clinical Trial Protocol
Iranian Registry of Clinical Trials

07 Nov 2026

Effects of Different Attentional Focus Strategies on Dynamic Stability and Movement Smoothness During Perturbed Gait: An Optimal Control–Based Analysis in Older Adults With and Without Mild Cognitive Impairment

Protocol summary

Study aim

The aim is to compare optimal movement smoothness and dynamic stability under different attentional strategies in older adults with and without mild cognitive impairment.

Design

Two-group quasi-experimental study with repeated measures. Participants with and without mild cognitive impairment will perform perturbation walking under four attentional conditions. Participants and outcome assessors will be blinded to group status; researchers will not be blinded. Trial phase: not applicable.

Settings and conduct

After screening, participants will be classified into groups with and without mild cognitive impairment. Each participant will perform perturbation walking and obstacle crossing under four attentional conditions: baseline, internal focus, near external focus, and far external focus. Kinematic data will be collected at the Sport Sciences Laboratory, Yazd University, and analyzed to assess dynamic stability, movement smoothness, and optimal motor control.

Participants/Inclusion and exclusion criteria

Participants will be adults aged 60–80 years who walk independently and will be classified as having or not having mild cognitive impairment. Inclusion criteria are independent walking, no conditions affecting walking or balance, and written informed consent. Exclusion criteria include severe visual/hearing impairment and a severe fall within the previous six months.

Intervention groups

Participants will be assessed in two groups: with and without mild cognitive impairment, under four attentional conditions: baseline, internal, near external, and far external focus.

Main outcome variables

Optimal relative weighting of movement smoothness and dynamic stability in the multi-objective optimal control model; dynamic stability assessed by Margin of Stability (MoS), movement smoothness by linear and angular jerk, and agreement between actual and optimized movement patterns by RMSE.

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20251115068000N2**
Registration date: **2026-09-14, 1405/06/23**
Registration timing: **prospective**

Last update: **2026-09-14, 1405/06/23**
Update count: **0**

Registration date

2026-09-14, 1405/06/23

Registrant information

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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2026-09-23, 1405/07/01

Expected recruitment end date

2026-10-07, 1405/07/15

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Effects of Different Attentional Focus Strategies on Dynamic Stability and Movement Smoothness During Perturbed Gait: An Optimal Control–Based Analysis in Older Adults With and Without Mild Cognitive Impairment

Public title

Effect of Attentional Strategies on Dynamic Stability and Movement Smoothness in Older Adults With and Without Mild Cognitive Impairment

Purpose

Supportive

Inclusion/Exclusion criteria

Inclusion criteria:

Age 60–80 years, ability to walk independently without an assistive device, absence of acute neurological, musculoskeletal, or other conditions that may affect walking or balance, and provision of written informed consent to participate in the study. For older adults with mild cognitive impairment, confirmation of mild cognitive impairment based on the cognitive assessment criteria specified in the study protocol is also required.

Exclusion criteria:

History of severe neurological, musculoskeletal, or other disorders affecting walking or balance; severe visual or hearing impairment; inability to walk independently without an assistive device; history of a severe fall within the previous six months; or failure to meet the required cognitive criteria for assignment to the respective study group.

Age

From **60 years** old to **80 years** old

Gender

Female

Phase

N/A

Groups that have been masked

- Participant
- Care provider
- Outcome assessor
- Data analyser

Sample size

Target sample size: **38**

Randomization (investigator's opinion)

Not randomized

Randomization description

Blinding (investigator's opinion)

Double blinded

Blinding description

This study will be conducted with blinding at the level of participants and outcome assessors. Participants will not be informed of their own cognitive status or that of other participants, specifically whether they belong to the cognitively healthy older adults group or the mild cognitive impairment (MCI) group. Due to the nature of the study and the need to provide specific instructions for performing the different attentional conditions, blinding participants to the type of attentional condition is not possible. Outcome assessors and personnel responsible for data processing and analysis will also be blinded to the participants' group status, and the data will be coded using unique identification codes for analysis. The principal investigator and the researcher responsible for conducting the experimental procedures will not be blinded to participants' group status because access to this information is necessary for proper implementation of the study protocol. Therefore, blinding in this study will be applied to participants' cognitive status and to outcome assessment and data analysis, whereas blinding of the principal investigator and the researcher conducting the experimental procedures is not feasible due to the nature of the study protocol.

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Research Ethics Committees of Tehran University - Faculty of Sport Sciences and Health

Street address

North Kargar Street, 15th Street, University of Tehran

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Tehran

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Tehran

Postal code

1439813117

Approval date

2026-08-15, 1405/05/24

Ethics committee reference number

IR.UT.SPORT.REC.1405.066

Health conditions studied

1

Description of health condition studied

Mild Cognitive Impairment

ICD-10 code

F06.7

ICD-10 code description

Mild cognitive disorder

Primary outcomes

1

Description
Dynamic stability based on the distance between the extrapolated center of mass and the base of support.
Timepoint
During all four attentional conditions in a single testing session.
Method of measurement
Calculated using the Margin of Stability from movement data and the position of the center of mass and base of support.

2

Description
Movement smoothness based on linear and angular jerk.
Timepoint
During all four attentional conditions in a single testing session.
Method of measurement
Calculated from linear and angular jerk derived from the recorded kinematic data during walking.

Secondary outcomes

empty

Intervention groups

1

Description
Control group: Older adults without mild cognitive impairment; perturbation walking under baseline, internal, near external, and far external attentional conditions.
Category
Behavior

2

Description
Intervention group: Older adults with mild cognitive impairment; the same task under the four attentional conditions.
Category
Behavior

Recruitment centers

1

Recruitment center
Name of recruitment center
Biomechanics Laboratory, Yazd University
Full name of responsible person
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Sponsors / Funding sources

1

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Web page address
https://yazd.ac.ir/offices/research/people/head
Grant name
Grant code / Reference number
Is the source of funding the same sponsor organization/entity?
Yes
Title of funding source
Yazd 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
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Position
Assistant porfessor
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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 related to the study protocol and statistical analysis plan may be available from the corresponding author upon reasonable request after publication of the study results. Individual participant data, informed consent forms, and identifiable information will not be publicly shared to protect participant confidentiality.
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
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
Undecided - It is not yet known if there will be a plan to make this available
Data Dictionary
No - There is not a plan to make this available
Title and more details about the data/document
De-identified movement data, including dynamic stability, movement smoothness, and optimal control measures, will be available for sharing after removal of personal identifiers.
When the data will become available and for how long
Available from 6 months after publication of the study results.
To whom data/document is available
Academic and scientific researchers may request access to the data.
Under which criteria data/document could be used
The data may be used for research purposes only, subject to confidentiality and protection of participant identity.
From where data/document is obtainable
Requests should be submitted to the principal investigator at Yazd University.
What processes are involved for a request to access data/document
Applicants should submit a request describing the research purpose and intended use of the data. Following review and approval by the principal investigator, the de-identified data will be provided to the applicant.

Comments