Clinical Trial Protocol
Iranian Registry of Clinical Trials

11 Sep 2026

Effect of Aerobic Exercise on Implicit Learning, Retention, and Transfer of Upper Extremity Motor Skills in Parkinson’s Patients with Freezing of Gait

Protocol summary

Study aim

Investigating and Comparing the Effect of Moderate-Intensity Aerobic Exercises on Implicit Learning, Recall, and Skill Transfer of Upper Limbs in Parkinson's Patients with Freezing of Gait

Design

Twenty-eight Parkinson's patients with freezing of gait symptoms were randomly assigned in a no-blind manner to either intervention or control groups.

Settings and conduct

hospitals and clinics across Tehran will be investigated.

Participants/Inclusion and exclusion criteria

✔ Age between 30 and 75 years ✔ Diagnosis of idiopathic Parkinson’s disease ✔ Disease stage 1–4 according to the Hoehn & Yahr scale ✔ Adequate cognitive status with a score above 24 on the MoCA test ✔ No history of addiction or diabetes ✔ No other neurological disorders ✔ No untreated orthopedic conditions ✔ Presence of Freezing of Gait (FOG) Exclusion Criteria: ✔ Individuals whose medication regimen changes during the study ✔ Development of disabling comorbid conditions during the study ✔ Presence of cardiovascular or respiratory problems

Intervention groups

Intervention Group: In the acquisition phase, before performing the simulated eating task, participants perform 30 minutes of moderate-intensity aerobic exercise (60–70% of maximum heart rate) on an ergometer. After 10 minutes of rest, the simulated eating task is performed. Control Group: This group rests in a seated position for a duration equal to the aerobic exercise time of the intervention group and enters the simulated eating task practice phase without performing aerobic exercise.

Main outcome variables

Upper limb skill learning Retention Transfer

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20160822029471N2**
Registration date: **2025-09-07, 1404/06/16**
Registration timing: **prospective**

Last update: **2025-09-07, 1404/06/16**
Update count: **0**

Registration date

2025-09-07, 1404/06/16

Registrant information

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Name of organization / entity
professor
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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2025-09-11, 1404/06/20

Expected recruitment end date

2025-10-22, 1404/07/30

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title
Effect of Aerobic Exercise on Implicit Learning, Retention, and Transfer of Upper Extremity Motor Skills in Parkinson’s Patients with Freezing of Gait

Public title
Effect of Aerobic Exercise on Implicit Learning in Parkinson’s Patients with Freezing of Gait

Purpose
Education/Guidance

Inclusion/Exclusion criteria

Inclusion criteria:
Parkinson's disease patients in Hohne and Yahr stage 1-4 intact cognitive function (i.e., score ≥24 on the Montreal Cognitive Assessment (MoCA))

Exclusion criteria:
cardiovascular and pulmonary problems

Age
From **30 years** old to **80 years** old

Gender
Both

Phase
N/A

Groups that have been masked
No information

Sample size
Target sample size: **28**

Randomization (investigator's opinion)
Randomized

Randomization description
After the initial assessments, patients with Parkinson's disease who have freezing of gait will be randomly allocated using a block randomization method (with concealed allocation via sealed opaque envelopes) in a 1:1 ratio into two groups: The group receiving aerobic exercise prior to motor training, and The group that does not receive aerobic exercise before motor training.

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 of Iran University of Medical Sciences

Street address
Hemmat highway

City
Tehran

Province
Tehran

Postal code
1449614535

Approval date
2023-03-11, 1401/12/20

Ethics committee reference number
IR.IUMS.REC.1401.1004

Health conditions studied

1

Description of health condition studied
Parkinson' s disease

ICD-10 code
G20

ICD-10 code description
Parkinson's disease

Primary outcomes

1

Description
Implicit learning, retention and transfer

Timepoint
قبل از مداخله - بعد از مداخله

Method of measurement
time

Secondary outcomes

empty

Intervention groups

1

Description
Intervention group: Patients in this group, prior to the motor learning sessions (three consecutive sessions), perform a total of three sessions of moderate-intensity aerobic exercise. The exercises are carried out on a stationary bicycle for 30 minutes. Exercise intensity is adjusted so that participants pedal at a rate of 50 to 70 revolutions per minute, corresponding to 70% of their maximum heart rate.

Category
Rehabilitation

2

Description
Control group: Patients in this group do not perform any aerobic exercise and remain at rest during this period.

Category
Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center
Rasol akram Hospital

Full name of responsible person
Amir hosseyn Habibi

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Rasoul-e Akram Hospital, Maziar Mansouri Street, Sattar khan Street

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Sponsors / Funding sources

1

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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
Iran University of Medical Sciences

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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Professor in Anatomy

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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
Yes - There is a plan to make this available
Statistical Analysis Plan
Not applicable
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
Part of the data, such as information related to the primary outcome or similar, can be shared.
When the data will become available and for how long
Access period begins 6 months after publication of the results.
To whom data/document is available
Data will be available to researchers affiliated with academic and scientific institutions.
Under which criteria data/document could be used
Data inspection is permitted provided proper citation is given.
From where data/document is obtainable
Dr. Mohammad Tagh Joghataei joghataei@iums.ac.ir
What processes are involved for a request to access data/document
Data are available for inspection by qualified researchers upon request, subject to appropriate citation and ethical considerations.
Comments