

Clinical Trial Protocol

Iranian Registry of Clinical Trials

10 Jun 2026

The Comparison of the Effect of Eccentric and Concentric Exercises to improve Function, Balance and Muscle Strength in Patients with Multiple Sclerosis

Protocol summary

Summary

1) Objectives: As, physiological effects of eccentric exercise on the muscle performance has been shown in several studies in normal subjects, compared to concentric exercise, this study has been designed to investigate the special effect of these two type exercise in the patients with multiple sclerosis . 2) Design: Randomized clinical trial. 3) Setting and conduct: Concentric (walking on a treadmill with positive slope) and eccentric (walking on a treadmill with negative slope) exercise protocols were designed for experimental groups. 4) Participants including major eligibility criteria: 30 patients with multiple sclerosis will be participated according to the inclusion criteria including; ability to walk 10 meter in a less than 1 minute (with or without aim) and exclusion criteria including; sever decrease of functional ability during last year, Pregnancy, Corticosteroid treatment during last month, Sever Psychological condition, Any conditions cause to prevent mild or moderate sport activities, regular sport activity twice a week for more than 10 minutes in each session, simultaneously present another medical condition such as diabetic, lower limb arthritis, unstable cardiovascular conditions. 5) Intervention: The exercise protocol (concentric or eccentric exercise) included 30 minutes walking on treadmill within 55% of Maximum Heart rate which progressively increase to 85% Maximum Heart rate , for 12 sessions, 3 times a week. 6) Main outcome: a) Functional activity evaluations: including Two-Minute Walk, Timed 25 Foot Walk and Timed Get-up and Go, b) Static and dynamic balance indexes, c) Maximum isometric Torque of the left and right quadriceps and hamstring muscles, d) Disability and Ability index by completing Guy's Neurological Disability Scale and Rivermead Mobility Index.

General information

Acronym

IRCT registration information

IRCT registration number: **IRCT201107261254N7**
Registration date: **2011-11-05, 1390/08/14**
Registration timing: **registered_while_recruiting**

Last update:

Update count: **0**

Registration date

2011-11-05, 1390/08/14

Registrant information

Name

Amir Hoshang Bakhtiary Davijani

Name of organization / entity

Semnan University of Medical Sciences

Country

Iran (Islamic Republic of)

Phone

+98 23 1444 1983

Email address

amirbakhtiary@sem-ums.ac.ir

Recruitment status

Recruitment complete

Funding source

Vice chancellor for research, Semnan University of Medical Sciences

Expected recruitment start date

2011-09-20, 1390/06/29

Expected recruitment end date

2012-09-20, 1391/06/30

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

The Comparison of the Effect of Eccentric and Concentric Exercises to improve Function, Balance and Muscle Strength in Patients with Multiple Sclerosis

Public title

The Comparison of the Effect of Eccentric and Concentric Exercises to improve Function, Balance and Muscle Strength in Patients with Multiple Sclerosis

Purpose

Treatment

Inclusion/Exclusion criteria

Inclusion Criteria: Multiple Sclerosis patients with ability to walk 10 meter in a less than 1 minute (with or without aim) exclusion Criteria: Sever decrease of functional ability during last year; Pregnancy; Corticosteroid treatment during last month, Sever Psychological condition, Any conditions cause to prevent mild or moderate sport activities; regular sport activity twice a week for more than 10 minutes in each session; simultaneously present another medical condition such as diabetic; lower limb arthritis; unstable cardiovascular conditions that cause noncooperation of subject during intervention

Age

From **18 years** old to **50 years** old

Gender

Both

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **15**

Randomization (investigator's opinion)

Randomized

Randomization description**Blinding (investigator's opinion)**

Single blinded

Blinding description**Placebo**

Not used

Assignment

Parallel

Other design features**Secondary Ids**

empty

Ethics committees**1****Ethics committee****Name of ethics committee**

Ethical Committee of Semnan University of Medical Sciences

Street address

Semnan University of Medical Sciences, Blv Basij

City

Semnan

Postal code**Approval date**

2011-10-26, 1390/08/04

Ethics committee reference number

90/111350

Health conditions studied**1****Description of health condition studied**

Multiple sclerosis

ICD-10 code

G35

ICD-10 code description

Demyelinating diseases of the central nervous system

Primary outcomes**1****Description**

Two-Minute Walk

Timepoint

Before and after intervention and also after 4 weeks follow-up

Method of measurement

By meter

2**Description**

Timed 25 Foot Walk

Timepoint

Before and after intervention and also after 4 weeks follow-up

Method of measurement

By chronometer

3**Description**

Timed Get-up and Go

Timepoint

Before and after intervention and also after 4 weeks follow-up

Method of measurement

By Chronometer

4**Description**

Static Balance Index

Timepoint

Before and after intervention and also after 4 weeks follow-up

Method of measurement

By Biodex Balance System

5

Description

Dynamic Balance Index

Timepoint

Before and after intervention and also after 4 weeks follow-up

Method of measurement

By Biodex Balance System

6

Description

Maximum isometric torque of quadriceps muscles

Timepoint

Before and after intervention and also after 4 weeks follow-up

Method of measurement

By Biodex Isokinetic Device 4Pro

7

Description

Maximum isometric torque of hamstring muscles

Timepoint

Before and after intervention and also after 4 weeks follow-up

Method of measurement

By Biodex Isokinetic Device 4Pro

Secondary outcomes

1

Description

Disability Rate

Timepoint

Before and after intervention and also after 4 weeks follow-up

Method of measurement

Guy's Neurological Disability Scale

2

Description

Ability rate

Timepoint

Before and after intervention and also after 4 weeks follow-up

Method of measurement

Rivermead Mobility Index (RMI)

Intervention groups

1

Description

30 minutes walking on treadmill with Positive slope (Concentric group), 3 times in a week, 4 weeks

Category

Rehabilitation

2

Description

30 minutes walking on treadmill with negative slope (Eccentric group), 3 times a week, 4 weeks

Category

Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center

Neuromuscular Rehabilitation Research Centre

Full name of responsible person

Dr Amir H Bakhtiary

Street address

Neuromuscular Rehabilitation Research Center, Ghods Blv.

City

Semnan

Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Vice chancellor for research, Semnan University of Medical Sciences

Full name of responsible person

Dr Raheb Ghorbani

Street address

Semnan University of Medical Sciences, Basij Blv.

City

Semnan

Grant name

Grant code / Reference number

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

Yes

Title of funding source

Vice chancellor for research, Semnan University of Medical Sciences

Proportion provided by this source

100

Public or private sector

empty

Domestic or foreign origin

empty

Category of foreign source of funding

empty

Country of origin

Type of organization providing the funding

empty

Person responsible for general inquiries

Contact

Name of organization / entity

Semnan University of Medical Sciences

Full name of responsible person

Amir Hoshang Bakhtiary

Position

PhD in Physiotherapy/ Associate Professor

Other areas of specialty/work**Street address**

Neuromuscular Rehabilitation Research Center,
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Fax**Email**

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Web page address**Person responsible for scientific inquiries****Contact****Name of organization / entity**

Semnan University of Medical Sciences

Full name of responsible person

Amir Hoshang Bakhtiary

Position

PhD in physiotherapy/ Associate Professor

Other areas of specialty/work**Street address**

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Web page address**Person responsible for updating data****Contact****Sharing plan****Deidentified Individual Participant Data Set (IPD)**

empty

Study Protocol

empty

Statistical Analysis Plan

empty

Informed Consent Form

empty

Clinical Study Report

empty

Analytic Code

empty

Data Dictionary

empty