

Clinical Trial Protocol

Iranian Registry of Clinical Trials

22 Jun 2026

Effect of eccentric training on knee muscles torque and functional tests in chronic stroke patients

Protocol summary

Study aim

The purpose of this study is to investigate the effect of eccentric training on knee muscles torque and functional tests in chronic stroke patients.

Design

This study is a randomized clinical trial, with parallel groups, double-blinded with 26 sample size.

Settings and conduct

This study will be performed in the Neuromuscular Rehabilitation Research Center in Semnan. Participants in the experimental group will walk on the treadmill with a negative 10% inclination for 30 minutes. Routine physiotherapy only will be performed in the control group. Training will be performed three times in the weeks for four weeks in both groups. Participants and outcome assessor will be blind in this study. Subjects will not be aware of being in which group. The outcome assessor will be the person other than the main investigator to reduce the bias in the study.

Participants/Inclusion and exclusion criteria

Inclusion criteria: Stroke patients should be in the chronic stage and the spasticity score of plantarflexor muscles should be smaller than 2 in the modified Ashworth scale. Exclusion criteria: Medical condition (apart from the stroke) that impair patients balance

Intervention groups

Participants in the experimental group will walk on the treadmill with a negative 10% inclination. Participants in addition to walking on their treadmill, undergo routine physiotherapy (functional electrical stimulation of Quadriceps muscle, balance exercises with tilt board, stretch training of the Gastrocnemius muscle, and training in daily activities). Participants only undergo routine physiotherapy in the control group. Training will be performed three times in the weeks for four weeks in both groups.

Main outcome variables

Quadriceps and Hamstrings muscles torque on the affected side

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20160424027562N7**

Registration date: **2019-01-06, 1397/10/16**

Registration timing: **registered_while_recruiting**

Last update: **2019-01-06, 1397/10/16**

Update count: **0**

Registration date

2019-01-06, 1397/10/16

Registrant information

Name

Roghayeh Mohammadi

Name of organization / entity

Semnan University of Medical Sciences

Country

Iran (Islamic Republic of)

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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2019-01-05, 1397/10/15

Expected recruitment end date

2019-06-21, 1398/03/31

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Effect of eccentric training on knee muscles torque and functional tests in chronic stroke patients

Public title

Effect of training in chronic stroke patients

Purpose

Treatment

Inclusion/Exclusion criteria**Inclusion criteria:**

All the patients should be more than 6 months poststroke
The spasticity score of plantarflexor muscles should be smaller than 2 in the modified Ashworth scale
Stroke patients should be in the chronic stage
They should be able to walk on treadmill

Exclusion criteria:

Medical condition (apart from stroke) that impair patients balance
Aphasia
Cognition deficiency

Age

From **40 years** old to **65 years** old

Gender

Both

Phase

N/A

Groups that have been masked

- Participant
- Outcome assessor

Sample size

Target sample size: **26**

Randomization (investigator's opinion)

Randomized

Randomization description

Randomization will be simple and individually. It will be performed by selecting a closed envelope by every patient, enrolling him/her to the experimental or control group.

Blinding (investigator's opinion)

Double blinded

Blinding description

In this study, participants and outcome assessor will be blind. Despite explained to patients adequately about the intervention, they will not be aware of being in the intervention or control group. The outcome assessor will be the person other than the main investigator to reduce the bias in the study.

Placebo

Not used

Assignment

Parallel

Other design features**Secondary Ids**

empty

Ethics committees**1****Ethics committee**

Name of ethics committee

Ethics committee of Semnan University of Medical Sciences

Street address

Semnan University of Medical Sciences, Basij Blvd, Semnan

City

Semnan

Province

Semnan

Postal code

3514799442

Approval date

2018-12-18, 1397/09/27

Ethics committee reference number

IR.SEMUMS.REC.1397.203

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

Stroke

ICD-10 code

I67.9

ICD-10 code description

Cerebrovascular disease, unspecified

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

Quadriceps muscle torque on the affected side

Timepoint

Before intervention, and 4 weeks after intervention

Method of measurement

Isokinetic System

2**Description**

Hamsrings muscle torque on the affected side

Timepoint

Before intervention, and 4 weeks after intervention

Method of measurement

Isokinetic System

Secondary outcomes**1****Description**

Time of the Timed Up and Go test

Timepoint

Before intervention, and 4 weeks after intervention

Method of measurement

Chronometer

2**Description**

Berg Balance Scale

Timepoint

Before intervention, and 4 weeks after intervention

Method of measurement

Questionnaire

3

Description

Functional Reach Test

Timepoint

Before intervention, and 4 weeks after intervention

Method of measurement

Ruler

Intervention groups

1

Description

Intervention group: Participants in the experimental group will walk on the treadmill with a negative 10% inclination for 30 minutes. In the first week, they will walk on the treadmill as fast as 55% of maximum heart rate and also they will walk in the second week with 65% of maximum heart rate and in the third week with 75% and in the fourth week with 85% maximum heart rate. Participants in addition to walking on their treadmill, undergo routine physiotherapy (functional electrical stimulation of Quadriceps muscle for 10 minutes, balance exercises with tilt board, stretch training of the Gastrocnemius muscle for 15 seconds, and training in daily activities). Training will be performed three times in the weeks for four weeks.

Category

Rehabilitation

2

Description

Control group: Participants undergo routine physiotherapy (functional electrical stimulation of Quadriceps muscle for 10 minutes, balance exercises with tilt board, stretch training of the Gastrocnemius muscle for 15 seconds, and training in daily activities). Training will be performed three times in the weeks for four weeks.

Category

Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center

Neuromuscular Rehabilitation Research Center

Full name of responsible person

Roghayeh Mohammadi

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Neuromuscular Rehabilitation Research Center,
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Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Semnan University of Medical Sciences

Full name of responsible person

Dr Parviz Kokhaei

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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

Semnan 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

Semnan University of Medical Sciences

Full name of responsible person

Roghayeh Mohammadi

Position

Assistant Professor

Latest degree

Ph.D.

Other areas of specialty/work

Physiotherapy

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Rehabilitation Faculty, Semnan University of Medical Sciences, 5 Kilometer of Damghan Road, Semnan, Iran

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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

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

Statistical Analysis Plan

Not applicable

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

Not applicable