Clinical Trial Protocol
Iranian Registry of Clinical Trials

28 Jun 2026

The immediate effect of kinesio taping of quadriceps muscle on position sense of knee joint following full squat in patients with multiple sclerosis

Protocol summary

Study aim

The purpose of this study is to compare the perception of knee joint position sense before and after rhythmic full squat protocol and to investigate the effect of using kinesiotape on perception of knee position sense between MS patients and healthy controls.

Design

Participants who were included are the control group (healthy) and the group of patients with MS who were in their sedentary phase, aged 20-35 years, were enrolled in this study in a non-randomized controlled clinical trial. The main variable is variable error, calculating the sample size, indicate that at least 12 samples were needed . Samples are selected voluntary, simple and non-probability sampling based on entry and exit criteria.

Settings and conduct

In this study, the study population is relapsing-remitting MS patients and the sample is those referred to MS Research Center (Sina Specialty Hospital).

Participants/Inclusion and exclusion criteria

inclusion criteria are patients with RRMS with age range between 20-35 years with EDSS≤6 who has no history of Anemia, surgery, fracture, cardiopulmonary and neuro muscular diseases, Diabetes, hypothyroidism, depression according to PHQ-9 ≤15 questionnaire.The subjects would be excluded from either group if they experienced any fatigue or stress before testing or unable to learn or collaborate in the processes.

Intervention groups

In both groups 1 - Measuring the knee joint position sense with the help of goniometer 2- Perform a rhythmic full squat until it reaches level 13 based on the BORG questionnaire, which is actually somewhat hard 3. Re-measuring the participant's knee position sense 4- Measurement of the patient's position sense of knee joint with kinesiotape on quadriceps muscle

Main outcome variables

Fatigue after squatting kinesiotape MS disease

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20200112046099N1**
Registration date: **2020-06-04, 1399/03/15**
Registration timing: **registered_while_recruiting**

Last update: **2020-06-04, 1399/03/15**
Update count: **0**

Registration date

2020-06-04, 1399/03/15

Registrant information

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Saina Aliabadi
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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2020-04-04, 1399/01/16

Expected recruitment end date

2020-10-07, 1399/07/16

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

The immediate effect of kinesio taping of quadriceps muscle on position sense of knee joint following full squat in patients with multiple sclerosis

Public title

The immediate effect of kinesio taping of quadriceps muscle on position sense of knee joint following full squat in patients with multiple sclerosis

Purpose

Treatment

Inclusion/Exclusion criteria

Inclusion criteria:

Recurrent-relapsing MS patients Disability level by Expanded Disability Status Scale ≤ 6 (EDSS) Age between 20-35 years Able to write and read Muscle strength should be three or more in quadriceps and hamstrings muscles No history of anemia No depression according to Patient Health Questionnaire-9 (PHQ-9). No history of Diabetes No history of hypothyroidism No illnesses that increase fatigue, such as myasthenia gravis Not having disruptive spasticity in doing exercises No history of surgery or fracture No history of drug use in the past 6 months No history of cardiopulmonary diseases Complaints of fatigue that cause Disturbance in daily activities (should distinguish between extreme daytime sleepiness and fatigue).

Exclusion criteria:

Inadequate data recording Decreasing one's motivation (not wanting to continue cooperation and intentionally declare score 13 in the fatigue questionnaire) Patient Unables to learn the process

Age

From **20 years** old to **35 years** old

Gender

Both

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **12**

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

National Committee on Ethics in Biomedical Research Tehran university of Medical Sciences

Street address

Floor 13, Block A, Headquarters of the Ministry Health and Medical Education, Simaye Iran street, Between south Falamak and Zarafshan, Qods town, Tehran

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Approval date

2019-05-07, 1398/02/17

Ethics committee reference number

IR.TUMS.FNM.REC.1398.012

Health conditions studied

1

Description of health condition studied

Relapsing-remitting multiple sclerosis

ICD-10 code

G35

ICD-10 code description

Multiple sclerosis

Primary outcomes

1

Description

1. Fatigue following rhythmic full squats, which is an independent variable , and based on the patient's self-expression is assessed using the BORG questionnaire, which has a range of 0-20, and when a person reaches a somewhat hard level, which is equivalent to 13 the full squat operation will not continue. 2. Kinesiotape, which is an independent nominal variable. 3. Multiple sclerosis, which is an independent nominal variable, relapsing remitting type of MS, which has been referred to us by a neurologist.

Timepoint

At first, the participant's knee joint was measured with the help of a goniometer, and then he was asked to perform a full rhythmic squat until the moment, according to the BORG questionnaire at level 13, which is actually somewhat hard. The participant's knee position was then re-measured to assess changes in position sense error following rhythmic full squats. In the next step, the kinesiotape was first applied to three of the four heads of quadriceps muscle, and then the patient's knee condition was measured again to asses position sense errors following therapeutic intervention (taping). In the final stage, the person performed a rhythmic full squat protocol on the muscle and the kinesiotape applied on muscle to check for changes in position sense errors following fatigue associated with taping.

Method of measurement

Kinesiological tape to examine its therapeutic effect in

compense participant's fatigue and its effect on position sense and using a standard goniometer to assess the patient's position sense (reconstruction from 90 degrees to 45 degrees of knee flexion)

Secondary outcomes

1

Description

position sense (including absolute, variable, and constant errors in angle reconstruction) that is a continuous dependent variable and is measured by the variance of the reconstructed angle. it measures with software and Goniameter and camera.

Timepoint

Before and after performing the full squat protocol, after attaching the kinesiotape on the quadriceps muscle, and finally after performing the full squat protocol while the tape is attached to the muscle.

Method of measurement

To test the position sense, a 16-megapixel Canon camera with a camera lens distance from the patient (80 cm) and a camera height from the ground (70 cm) was first placed. using markers on land marks was then performed on standard areas (greater trochanter of femur, lateral condyle offemur, head of the fibula, and lateral malleolus of the dominant limb). The patient then sat on the edge of the bed with his eyes closed so that his knees were at 90 degrees of flexion and the opposite leg was fixed on an adjustable, motionless stand. With a standard goniometer, the fixed arm of goniameter was placed on the thigh and the movable arm of goniameter was placed on the leg (fibula), the desired angle (about 45 degrees) was determined for the patient, so that the person should test this angle without a manual contact. It was kept for 5 seconds and then the patient was asked to return to the starting position (90 degree angle). The patient was then asked to raise his legs from 90 to 45 degrees with his eyes closed, and whenever he felt that his knee had been raised from 90 to 45 degrees, he would use a laser to flash on the front wall. The moment the laser light was seen, the reconstructed image was immediately photographed. The reconstruction was performed four times with a 5-second break between each repetition. Images were analyzed by the software in Excel environment and changes in the absolute, variable and constant errors of position sense were calculated.

Intervention groups

1

Description

Intervention group: MS group with relapsing remitting MS, Control group: Healthy people. Both groups will receive a similar intervention in a treatment session that includes measuring the position sense of knee joint in four stages: a) before fatigue, b) after fatigue, when we ask the participant to stand near the edge of the bed and do a rhythmic squat with a steady metronome, and when he feels he has reached level 13 of the BORG (somewhat hard) questionnaire, the protocol will stop.c) 30-40% traction of kinesiotape on the three heads of the quadriceps muscle is attached. And d) Taping and fatigue is combined with the use of a limitator. At each step, we take a picture with a 16-megapixel Canon digital camera that it's validity and reliability have been established.

Category

Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center
research center of MS in Sina Hospital

Full name of responsible person
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Sponsors / Funding sources

1

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Grant name

Vice chancellor for research of Tehran university of

Medical Sciences

Grant code / Reference number

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

Yes

Title of funding source

Tehran 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

Tehran University of Medical Sciences

Full name of responsible person

Saina Aliabadi

Position

master student

Latest degree

Bachelor

Other areas of specialty/work

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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

there is no more information

Study Protocol

No - There is not a plan to make this available

Statistical Analysis Plan

No - There is not 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

No - There is not a plan to make this available

Data Dictionary

No - There is not a plan to make this available