

Clinical Trial Protocol

Iranian Registry of Clinical Trials

10 Jun 2026

Effects of adding massage gun before or after dry needling versus dry needling alone on hamstring flexibility, strength and performance, and post-needling soreness in male amateur bodybuilders with hamstring shortness

Protocol summary

Study aim

to investigate the effect of adding percussive massage before or after dry needling and comparing it with dry needling alone on hamstring muscle flexibility, strength, and function, and needle-induced discomfort in a group of male amateur bodybuilders with hamstring muscle shortening

Design

three groups: dry needling intervention alone with 5 mins of rest, dry needling intervention group with 5 mins of percussion massage afterwards, and dry needling intervention group with 5 mins of percussion massage before it Single-blinded 36 people Block randomization

Settings and conduct

In the Boys' Medical Sciences Dormitory, A physiotherapist, who is unaware of group allocation, will record participant characteristics and measure study variables before the intervention, immediately after the intervention, and 24 hours after the intervention Another physiotherapist will administer the interventions.

Participants/Inclusion and exclusion criteria

Inclusion criteria Male amateur bodybuilders 18-40 years Short hamstring Exclusion criteria Use of nonsteroidal anti-inflammatory drugs contraindications for dry needling contraindications for percussive massage Low back pain or radicular pain within the past 3 months History of back, hip, or knee surgery Hamstring strain within the past 3 months History of musculoskeletal diseases in the lower extremities Unwillingness to participate in the study

Intervention groups

dry needling intervention needles are inserted into 3 locations of the hamstrings for 1 minute in a single session, using a fast in-out cone-shaped technique percussion massage intervention massage is applied to the hamstring muscle for 5 minutes with a massage

device

Main outcome variables

Hamstring muscle length Hamstring stretch tolerance angle Hamstring strength in isometric contraction Hamstring to quadriceps contraction ratio Triple hop test Needle irritation Pressure pain threshold

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20250313065062N1**
Registration date: **2025-05-05, 1404/02/15**
Registration timing: **registered_while_recruiting**

Last update: **2025-05-05, 1404/02/15**

Update count: **0**

Registration date

2025-05-05, 1404/02/15

Registrant information

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Name of organization / entity

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Recruitment status

Recruitment complete

Funding source

Expected recruitment start date

2025-05-05, 1404/02/15
Expected recruitment end date
2025-08-06, 1404/05/15
Actual recruitment start date
empty
Actual recruitment end date
empty
Trial completion date
empty

Scientific title
Effects of adding massage gun before or after dry needling versus dry needling alone on hamstring flexibility, strength and performance, and post-needling soreness in male amateur bodybuilders with hamstring shortness

Public title
Effects of adding massage gun before or after dry needling versus dry needling alone on hamstring flexibility, strength and performance, and post-needling soreness in male amateur bodybuilders with hamstring shortness

Purpose
Treatment

Inclusion/Exclusion criteria
Inclusion criteria:
Male amateur bodybuilders with at least three two-hour training sessions per week Age range 18 to 40 years Hamstring shortening ≥ 20 degrees in the dominant leg, determined by active knee extension testing Body mass index (BMI) between 18.5 and 29.9 kg/m²
Exclusion criteria:
Use of nonsteroidal anti-inflammatory drugs, analgesics, or muscle relaxants during the study period Having any contraindications for dry needling, including, medical emergency or acute medical condition, local infection, lymphedema, coagulation disorders such as hemophilia, epilepsy, metal sensitivity (dry needling) Having any contraindications for percussive massage, including varicose veins, broken bones, areas with blood clots Back pain or radicular pain within the past 3 months History of back, hip, or knee surgery within the past year of hamstring strain within the past 3 months History of orthopedic or neurological diseases in the lower extremities

Age
From **18 years** old to **40 years** old

Gender
Male

Phase
N/A

Groups that have been masked

- Outcome assessor

Sample size
Target sample size: **36**

Randomization (investigator's opinion)
Randomized

Randomization description
Randomization will be performed using Block
Randomization and allocation concealment will be done

using sequentially numbered, opaque, sealed envelopes. This method is one of the common methods of concealing random allocation, which is known as the SNOSE method for short. The random allocation process will be performed by someone outside the research team before the study begins. Finally, each individual's study group assignment will be determined according to the contents of the envelope provided to them. Accordingly, individuals will be divided into three groups: dry needling alone, dry needling with percussion massage before, and dry needling with percussion massage after.

Blinding (investigator's opinion)

Single blinded

Blinding description

A trained physiotherapist, blinded to group allocation, recorded participant characteristics including age, weight, and height and measured study variables before, immediately after, and 24 hours after the intervention. Another experienced physiotherapist performed the interventions on the dominant leg of the individual with hamstring shortening.

Placebo

Not used

Assignment

Parallel

Other design features

Secondary Ids

empty

Ethics committees

1

Ethics committee

Name of ethics committee

Ethics Committee of the Faculty of Nursing and Midwifery and the Faculty of Rehabilitation - Tehran

Street address

Shahrak Qods (West), between South Flamack and Zarafshan, Simay Iran Street - Central Headquarters of the Ministry of Health, Treatment and Medical Education, Block A, 13th Floor

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...

Approval date

2025-03-11, 1403/12/21

Ethics committee reference number

IR.TUMS.FNM.REC.1403.199

Health conditions studied

1

Description of health condition studied

hamstring shortness

ICD-10 code

ICD-10 code description

Primary outcomes

1

Description

Hamstring muscle flexibility

Timepoint

Before the intervention, immediately after the intervention, and 24 hours after the intervention

Method of measurement

With goniometer in active knee extension test 90/90

2

Description

Hamstring stretch tolerance angle degree

Timepoint

Before the intervention, immediately after the intervention, and 24 hours after the intervention

Method of measurement

With goniometer in active knee extension test 90/90

3

Description

Maximum hamstring strength in isometric contraction at 45 and 60 degree knee angles

Timepoint

Before the intervention, immediately after the intervention, and 24 hours after the intervention

Method of measurement

Dynamometer

4

Description

Hamstring to quadriceps contraction ratio at 45 and 60 degree knee angles

Timepoint

Before the intervention, immediately after the intervention, and 24 hours after the intervention

Method of measurement

Dynamometer and ratio formula

5

Description

Performance

Timepoint

Before the intervention, immediately after the intervention, and 24 hours after the intervention

Method of measurement

Triple hop test

6

Description

Dry needling soreness

Timepoint

Before the intervention, immediately after the intervention, and 24 hours after the intervention

Method of measurement

Numerical pain rating scale

7

Description

Pressure pain threshold

Timepoint

Before the intervention, immediately after the intervention, and 24 hours after the intervention

Method of measurement

Algometer

Secondary outcomes

empty

Intervention groups

1

Description

Control group: Dry needling . A physiotherapist will use sterile disposable needles (Eacu brand, Korea) for dry needling, using hygienic measures such as wearing gloves and using alcohol to disinfect the site and gloves, and then the used needles will be placed in the Safety Box. During a session, participants will be needled at three points on the hamstrings for 1 minute using the fast in-out cone-shaped technique in the prone position. Two points on the short and long heads of the biceps femoris muscle will be needled at 60% and 30% of the distance from the ischial tuberosity to the fibular head, respectively. The third point targets the semimembranosus and semitendinosus muscles at 60% of the distance from the ischial tuberosity to the medial femoral epicondyle.

Category

Rehabilitation

2

Description

Intervention group 1: Dry needling followed by percussion massage intervention, percussion massage intervention: Percussion massage is applied to the hamstring muscle for 5 minutes with a Booster Lightstaber (china) massage device at a speed of 3200 revolutions per minute (rpm) equivalent to a frequency of 53 Hz with a "hard ball" head. The semimembranosus and semitendinosus muscles are massaged in the first 2.5 minutes of massage and the biceps femoris muscle in the second 2.5 minutes. In the first 2.5 minutes, the massage begins from the inner side of the muscle, focusing on applying equal pressure throughout the massage. The massage is performed by moving the device from distal to proximal and from proximal to distal in a straight line for 20 seconds. In the last 2.5 minutes, the massage device is moved outward at the distal end of the muscle and the application is performed from distal to proximal and then distal. In this way, the massage for each muscle starts from the inside and ends on the outside.

Category

Rehabilitation

3**Description**

Intervention group 2: Dry needling and before that, percussion massage intervention, percussion massage intervention: Percussion massage is applied to the hamstring muscle for 5 minutes with a Booster Lightstaber (china) massage device at a speed of 3200 revolutions per minute (rpm) equivalent to a frequency of 53 Hz with a "hard ball" head. The semimembranosus and semitendinosus muscles are massaged in the first 2.5 minutes of massage and the biceps femoris muscle in the second 2.5 minutes. In the first 2.5 minutes, the massage begins from the inner side of the muscle, focusing on applying equal pressure throughout the massage. The massage is performed by moving the device from distal to proximal and from proximal to distal in a straight line for 20 seconds. In the last 2.5 minutes, the massage device is moved outward at the distal end of the muscle and the application is performed from distal to proximal and then distal. In this way, the massage for each muscle starts from the inside and ends on the outside.

Category

Rehabilitation

Recruitment centers**1****Recruitment center****Name of recruitment center**

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Full name of responsible person

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Sponsors / Funding sources**1****Sponsor****Name of organization / entity**

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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

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

Mohsen Ghoorchibeigi

Position

Student

Latest degree

Bachelor

Other areas of specialty/work

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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

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

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

Not applicable

Data Dictionary

Not applicable