Clinical Trial Protocol
Iranian Registry of Clinical Trials

09 Nov 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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Province

Tehran

Postal code

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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
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Sponsors / Funding sources

1

Sponsor
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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
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Mohsen Ghoorchibeigi
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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