

Clinical Trial Protocol

Iranian Registry of Clinical Trials

11 Sep 2026

Comparing the effects of Proprioceptive neuromuscular facilitation stretches(PNF) and Muscle energy technique(MET) techniques on strength, balance, and flexibility in athletes with hamstring shortness.

Protocol summary

Study aim

The aim of the present study was to compare the effects of two active stretching techniques, namely proprioceptive neuromuscular facilitation (PNF) and muscle energy (MET), on flexibility, strength, and dynamic balance in athletes with hamstring shortening.

Design

This study was a quasi-experimental study with a pre-test-post-test design and two experimental groups. A total of 38 athletes with hamstring tightness were randomly assigned to two PNF and control groups.

Settings and conduct

Corrective Exercise and Pathology Laboratory, Allameh Tabatabaee University

Participants/Inclusion and exclusion criteria

Inclusion criteria were hamstring shortening confirmed by active and passive knee extension angle testing (angle greater than 20 degrees), no history of severe injury, surgery, back pain, or leg pain in the past six months, no neuromuscular problems affecting balance, no use of medications affecting muscle function and balance, and willingness and ability to participate in all phases of the research protocol. Exclusion criteria included no confirmation of hamstring shortening on active testing, new acute or chronic lower extremity injuries, symptoms of paralysis or tingling in the lower extremity, presence of neurological or musculoskeletal disorders that would alter balance or strength, and inability to complete all phases of the stretching protocol or voluntary withdrawal.

Intervention groups

The present study is a quasi-experimental study with a pretest-posttest design and two experimental groups. The effect of the type of stretching program as an independent variable (at two levels: PNF technique and MET technique) on the dependent variables of the study including flexibility, strength, and dynamic balance of the

hamstring muscles will be investigated.

Main outcome variables

Improvements in balance, flexibility, and strength and comparison of changes between stretching methods

General information

Reason for update

Acronym

IRCT registration information

IRCT registration number: **IRCT20260801070478N1**

Registration date: **2026-08-05, 1405/05/14**

Registration timing: **prospective**

Last update: **2026-08-05, 1405/05/14**

Update count: **0**

Registration date

2026-08-05, 1405/05/14

Registrant information

Name

Armin Afifi

Name of organization / entity

Allameh tabatabaei university

Country

Iran (Islamic Republic of)

Phone

+98 44 3365 9843

Email address

armin_afifi@atu.ac.ir

Recruitment status

recruiting

Funding source

Expected recruitment start date

2026-08-11, 1405/05/20

Expected recruitment end date

2026-09-21, 1405/06/30

Actual recruitment start date

empty

Actual recruitment end date

empty

Trial completion date

empty

Scientific title

Comparing the effects of Proprioceptive neuromuscular facilitation stretches(PNF) and Muscle energy technique(MET) techniques on strength, balance, and flexibility in athletes with hamstring shortness.

Public title

Comparing the effects of two stretching techniques on strength, balance, and flexibility in athletes with hamstring shortness.

Purpose

Supportive

Inclusion/Exclusion criteria**Inclusion criteria:**

Having hamstring shortening confirmed using active and passive knee extension angle testing (angle greater than 20 degrees) No severe injury, history of surgery, back pain, or leg pain in the past six months, no neuromuscular problems affecting balance Avoid using medications that affect muscle function, balance, and fitness. Willingness and ability to participate in all stages of the research protocol

Exclusion criteria:**Age**

From **18 years** old to **29 years** old

Gender

Male

Phase

N/A

Groups that have been masked

No information

Sample size

Target sample size: **38**

Randomization (investigator's opinion)

N/A

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

Allameh Tabatabaei University Research Ethics Committee

Street address

Shahid Hemmat Student Dormitory, Susan Ave, Sattarkhan Blvd

City

Tehran

Province

Tehran

Postal code

1452654861

Approval date

2025-06-09, 1404/03/19

Ethics committee reference number

IR/ethics.2025.85999.1312

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

hamstring shortness

ICD-10 code**ICD-10 code description****Primary outcomes****1****Description**

People with hamstring tightness

Timepoint

Before and after interventions

Method of measurement

Active and passive knee extension test

Secondary outcomes

empty

Intervention groups**1****Description**

Intervention group: Receive PNF stretching for two weeks, two sessions per week

Category

Rehabilitation

2**Description**

Intervention group: Receive MET stretching for two weeks, two sessions per week

Category

Rehabilitation

Recruitment centers

1

Recruitment center

Name of recruitment center

Faculty of Sport Sciences, Allameh Tabatabaee University

Full name of responsible person

Armin Afifi

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afifiarmin@gmail.com

Sponsors / Funding sources

1

Sponsor

Name of organization / entity

Allameh Tabatabaee university

Full name of responsible person

Farideh Babakhani

Street address

Shahid Hemmat Student Dormitory, Susan Ave, Sattarkhan Blvd

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Grant name**Grant code / Reference number****Is the source of funding the same sponsor organization/entity?**

No

Title of funding source

Allameh Tabatabaee university

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

Allameh Tabatabaee university

Full name of responsible person

Armin Afifi

Position

master student

Latest degree

Master

Other areas of specialty/work

corrective exercises

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Person responsible for updating data

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Sharing plan**Deidentified Individual Participant Data Set (IPD)**

Yes - There is a plan to make this available

Study Protocol

Yes - There is a plan to make this available

Statistical Analysis Plan

Yes - There is a plan to make this available

Informed Consent Form

Yes - There is a plan to make this available

Clinical Study Report

Yes - There is a plan to make this available

Analytic Code

Yes - There is a plan to make this available

Data Dictionary

Yes - There is a plan to make this available

Title and more details about the data/document

Some data, such as information related to the main outcome or the like, can be shared.

When the data will become available and for how long

Access period starts 6 months after results are published.

To whom data/document is available

The data will only be available to researchers working in academic and scientific institutions.

Under which criteria data/document could be used

Can be used in all conditions.

From where data/document is obtainable

Responsible email: afifiarmin@gmail.com

What processes are involved for a request to access data/document

The request will be answered within three business days of receiving the email.

Comments