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# Acute non-local effects of static stretching of the thigh muscles on drop jumping performance

**Submission date**
14/11/2025

**Recruitment status**
No longer recruiting

**Registration date**
31/03/2026

**Overall study status**
Completed

**Last Edited**
31/03/2026

**Condition category**
Musculoskeletal Diseases

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[ ] Results
[ ] Individual participant data
[X] Record updated in last year

**Plain English summary of protocol**
Background and study aims
The study investigates how stretching the muscles in the legs affects flexibility and jumping performance. Researchers aim to understand the short-term impact of static stretching on these abilities in healthy young adults.

Who can participate?
Adults aged 18 or older who are physically active but not competitive athletes. Participants do not have muscle, joint, or nerve problems.

What does the study involve?
Participants attend one session in a laboratory. During this session, they complete flexibility and jumping tests before and after a stretching routine, and again 15 minutes later.

What are the possible benefits and risks of participating?
There is very little risk, although participants might feel mild discomfort while stretching. They may improve flexibility and help researchers learn more about sports science.

Where is the study run from?
The University of Palermo in Italy.

When is the study starting and how long is it expected to run for?
September 2022 to March 2023.

Who is funding the study?
The University of Palermo in Italy.

Who is the main contact?
Mr Antonino Scardina, University of Palermo – antonino.scardina01@unipa.it

## Contact information

**Type(s)**

Principal investigator, Scientific

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# Additional identifiers

# Study information

**Scientific Title**
Acute non-local effects of static stretching of the thigh muscles on drop jumping performance

**Study objectives**
To evaluate the effects of static stretching on flexibility and neuromuscular performance in healthy young adults.

## Ethics approval required
Ethics approval required

## Ethics approval(s)
Approved 25/11/2021, University of Palermo Bioethical Committee (Piazza Marina n. 61, Palermo, 90133, Italy; +39 91 238 93853; comitato.bioetica@unipa.it), ref: 65/2021

## Primary study design
Interventional

## Allocation
Randomized controlled trial

## Masking
Open (masking not used)

## Control
Dose comparison

## Assignment
Crossover

## Purpose
Basic science, Treatment

## Study type(s)

## Health condition(s) or problem(s) studied
Healthy young adults without musculoskeletal or neurological disorders; study focuses on normal physiological responses to static stretching.

## Interventions
Participants perform a static stretching protocol targeting the hamstring muscles. The protocol consists of repeated static stretches held for 30 seconds each, with controlled intensity below the discomfort threshold. The intervention is performed under supervision in a laboratory setting.
A control condition involving rest or no stretching is included to compare the physiological and functional responses.

Randomisation was performed using an online tool (www.randomizer.org). The platform generated a concealed allocation sequence assigning participants to the five conditions; group allocation was revealed only upon arrival at the laboratory. Due to the nature of the interventions, neither participants nor investigators were blinded.

## Intervention Type
Behavioural

## Primary outcome(s)
1. Hamstring flexibility measured using Passive straight leg raise (SLR) angle measured with a goniometer or motion analysis system to assess range of motion at baseline (T0), immediately post-intervention (T1), and 15 min post-intervention (T2)

2. Jump performance measured using Peak jump height and flight time during single-leg drop jump measured using an Optojump optical measurement system. at baseline (T0), immediately post-intervention (T1), and 15 min post-intervention (T2)

3. Passive hip extension (PHE) angle measured using PHE test performed using a digital inclinometer (or goniometer) to assess hip extension range of motion and muscle flexibility. at baseline (T0), immediately post-intervention (T1), and 15 min post-intervention (T2)

### Key secondary outcome(s)

### Completion date
30/03/2023

## Eligibility

### Key inclusion criteria
1. Healthy young adults
2. ≥18 years and able to provide written informed consent
3. Physically active (engaging in physical activity at least twice per week) but not competitive athletes
4. Hamstring flexibility ≥60° on passive straight leg raise at baseline
5. Able to perform study procedures
6. Including static stretching protocols and single-leg drop jumps from a 40-cm box in a laboratory setting

### Healthy volunteers allowed
Yes

### Age group
Adult

### Lower age limit
18 Years

### Upper age limit
35 Years

### Sex
All

### Total final enrolment
90

### Key exclusion criteria
1. History of musculoskeletal injury or lower limb surgery within the past 6 months
2. Presence of neurological, cardiovascular, or systemic disorders affecting movement or performance
3. Regular participation in structured flexibility or stretching programs (≥3 times per week)

4. Current pain or discomfort in the lower limbs or spine
5. Use of medications that could influence muscle tone, balance, or coordination
6. Inability or unwillingness to comply with study procedures or provide informed consent

**Date of first enrolment**
01/09/2022

**Date of final enrolment**
30/03/2023

# Locations

**Countries of recruitment**
Italy

# Sponsor information

**Organisation**
University of Palermo

**ROR**
https://ror.org/04fz79c74

# Funder(s)

**Funder type**

**Funder Name**
Università degli Studi di Palermo

**Alternative Name(s)**
Palermo University, University of Palermo

**Funding Body Type**
Government organisation

**Funding Body Subtype**
Local government

**Location**
Italy

# Results and Publications

## Individual participant data (IPD) sharing plan

### IPD sharing plan summary
Not expected to be made available