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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

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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