

# A comparison of once- and twice-weekly eccentric training on muscular health of older adults

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<b>Registration date</b> 24/01/2024	<b>Overall study status</b> Completed	<input type="checkbox"/> Protocol
<b>Last Edited</b> 02/05/2024	<b>Condition category</b> Musculoskeletal Diseases	<input type="checkbox"/> Statistical analysis plan
		<input checked="" type="checkbox"/> Results
		<input checked="" type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

Currently, the Chief Medical Officers in the United Kingdom recommend that older adults partake in strength or balance training twice per week to improve muscular function. However, adherence to these recommendations is low with time and physical capacity being reported as two barriers to meeting these guidelines. Eccentric resistance training (lengthening of the muscle whilst contracting) results in greater muscular adaptations than traditional resistance and requires a lower metabolic demand, therefore fewer weekly sessions may be required and they should be easier to tolerate, even for those with pre-existing comorbidities. Therefore, this study aimed to compare the effects of once-weekly eccentric resistance training to twice-weekly resistance training on muscular structure and function in healthy older adults.

### Who can participate?

Community-dwelling older adults (aged 60 years and over) who can ambulate independently, do not suffer from any musculoskeletal or neuromuscular diseases, and are not taking any medication that may affect muscular function or balance

### What does the study involve?

Participants are randomly allocated to one of three groups. The non-active control group maintained normal living conditions whereas the two training groups performed multi-joint isokinetic eccentric exercise for 12 weeks at 50% of their maximum eccentric strength. The once-weekly training group trained once per week and the twice-weekly training group trained twice per week; training volume was not matched between groups. The training lasted for 7 minutes in week 1 and progressed to 12 minutes in week 4, which remained the same hereafter until the training programme was completed in week 12. Participants were assessed at baseline, mid-training (week 7) and post-training (week 13).

### What are the possible benefits and risks of participating?

Possible benefits are improvements in muscle strength, power, and size, whereas possible risks are muscle fatigue and temporary exercise-induced muscle damage.

Where is the study run from?  
University of Northampton Health and Performance Laboratory (UK)

When is the study starting and how long is it expected to run for?  
November 2018 to March 2021

Who is funding the study?  
Wellcome Trust (UK)

Who is the main contact?  
Mr Brett Baxter, [brett.baxter@northampton.ac.uk](mailto:brett.baxter@northampton.ac.uk)

## Contact information

### Type(s)

Public, Scientific, Principal investigator

### Contact name

Mr Brett Baxter

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## Additional identifiers

### Clinical Trials Information System (CTIS)

Nil known

### ClinicalTrials.gov (NCT)

Nil known

### Protocol serial number

IRAS 339894

## Study information

### Scientific Title

Effects of once- versus twice-weekly eccentric resistance training on muscle structure and function in older adults

### Acronym

G1XG2XECC

### **Study objectives**

1. Both eccentric resistance training groups (once- and twice-weekly) would alter muscle structure and function
2. The twice-weekly training group would alter muscle structure and function to a greater extent than the once-weekly group

### **Ethics approval required**

Ethics approval required

### **Ethics approval(s)**

approved 11/12/2018, University of Northampton Research Ethics Committee (Faculty of Art, Science, and Technology, Waterside Campus, University Drive, Northampton, NN1 5PH, United Kingdom; +44 (0)1604892523; Merryn.Ekberg@Northampton.ac.uk), ref: ETH1819-0053

### **Study design**

Parallel randomized controlled trial

### **Primary study design**

Interventional

### **Study type(s)**

Efficacy

### **Health condition(s) or problem(s) studied**

Improving neuromuscular structure and function in healthy older adults

### **Interventions**

Parallel randomisation was performed using a random number generator online. The non-active control group maintained normal living conditions whereas the two training groups performed multi-joint isokinetic eccentric exercise for 12 weeks at 50% of their maximum eccentric strength. The once-weekly training group trained once per week and the twice-weekly training group trained twice per week; training volume was not matched between groups. The training lasted for 7 minutes in week 1 and progressed to 12 minutes in week 4, which remained the same hereafter until the training programme was completed in week 12. Participants were assessed at baseline, mid-training (week 7) and post-training (week 13).

### **Intervention Type**

Other

### **Primary outcome(s)**

Lower-limb muscular strength measured via dynamometry at baseline, mid-training (week 7) and post-training (week 13)

### **Key secondary outcome(s)**

1. Lower-limb muscular power measured using the 10-repetition sit-to-stand test at baseline, mid-training (week 7) and post-training (week 13)
2. Vastus lateralis muscle thickness measured using B-mode ultrasonography at baseline, mid-training (week 7) and post-training (week 13)

**Completion date**

26/03/2021

## Eligibility

**Key inclusion criteria**

1. ≥60 years of age
2. Able to independently ambulate without walking aids
3. Free from any illnesses and/or medication that affected the neuromuscular system or balance
4. Not currently involved in a structured exercise programme

**Participant type(s)**

Healthy volunteer

**Healthy volunteers allowed**

No

**Age group**

Senior

**Lower age limit**

60 years

**Upper age limit**

100 years

**Sex**

All

**Total final enrolment**

42

**Key exclusion criteria**

1. <60 years of age
2. Enrolled in a resistance training programme
3. Diagnosed with a neuromuscular or musculoskeletal disease that affects balance and/or strength
4. On medication that affects neuromuscular or musculoskeletal health

**Date of first enrolment**

29/04/2019

**Date of final enrolment**

31/05/2019

## Locations

**Countries of recruitment**

United Kingdom

England

**Study participating centre**  
**University of Northampton**  
University Drive  
Northampton  
United Kingdom  
NN1 5PH

## Sponsor information

**Organisation**  
University of Northampton

**ROR**  
<https://ror.org/04jp2hx10>

## Funder(s)

**Funder type**  
Charity

**Funder Name**  
Wellcome Trust

**Alternative Name(s)**  
Wellcome, WT

**Funding Body Type**  
Private sector organisation

**Funding Body Subtype**  
Trusts, charities, foundations (both public and private)

**Location**  
United Kingdom

## Results and Publications

**Individual participant data (IPD) sharing plan**

The datasets generated during and/or analysed during the current study are stored in a publicly available repository

The name of the repository: PURE

A persistent weblink to the dataset: <https://doi.org/10.24339/3373b688-e811-4847-9f38-ccf09a9c843a>

The type of data stored: objective discrete data

The process for requesting access (if non-publicly available): N/A

Dates of availability: N/A

Whether consent from participants was required and obtained: yes

Comments on data anonymization: data are anonymised using participant ID numbers

Any ethical or legal restrictions: no

### IPD sharing plan summary

Stored in publicly available repository

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>		26/04/2024	02/05/2024	Yes	No
<a href="#">Dataset</a>		16/10/2023	19/01/2024	No	No
<a href="#">Participant information sheet</a>			19/01/2024	No	Yes