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

Submission date
19/01/2024

Recruitment status
No longer recruiting

Registration date
24/01/2024

Overall study status
Completed

Last Edited
02/05/2024

Condition category
Musculoskeletal Diseases

[ ] Prospectively registered
[ ] Protocol
[ ] Statistical analysis plan
[X] Results
[X] 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

Contact information

Type(s)
Public, Scientific, Principal Investigator

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Additional identifiers

EudraCT/CTIS number
Nil known

IRAS number

ClinicalTrials.gov number
Nil known

Secondary identifying numbers
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

Secondary study design
Randomised controlled trial

Study setting(s)
Laboratory

Study type(s)
Efficacy

Participant information sheet
Not available in web format, please use contact details to request a participant information sheet

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

Secondary outcome measures
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)

Overall study start date
23/11/2018

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

Age group
Senior

Lower age limit
60 Years

Upper age limit
100 Years

Sex
Both

Target number of participants
24

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
England

United Kingdom

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

Sponsor information

Organisation
University of Northampton

Sponsor details
Waterside Campus
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Sponsor type
University/education

Website
http://www.northampton.ac.uk/

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

Publication and dissemination plan
The project has been presented at European College of Sport Science 2023, Paris, and the project is intended to be published in a peer-reviewed journal.

Intention to publish date
01/03/2024

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?
Dataset		16/10/2023	19/01/2024	No	No
Participant information sheet			19/01/2024	No	Yes
Results article		26/04/2024	02/05/2024	Yes	No