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Effects of blood flow restriction training on muscle strength for elders

Submission date
05/09/2024

Recruitment status
No longer recruiting

Registration date
19/09/2024

Overall study status
Completed

Last Edited
06/09/2024

Condition category
Other

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

Plain English summary of protocol

Background and study aims
Recently, the blood flow restriction training method has become popular. The common blood flow restriction training method uses voodoo tape, but the extent of blood flow restriction cannot be quantified using such an approach. Currently, there is a blood flow restriction system, which can measure limb occlusion pressure (LOP). However, the effects of different levels of blood flow restriction combined with resistance training on muscle strength and functional performance remain unclear. Hence the purpose of this study is to investigate the effects of different extents of blood flow restriction on muscle strength and functional movement performance.

Who can participate?
People who live in Taiwan and aged 65-85 years old who are without significant injuries within 6 months (such as fractures)

What does the study involve?
Participants are randomly allocated to one of three groups:
1. High blood flow restriction: participants will perform knee extension exercises under high blood flow restriction with low resistance training
2. Low blood flow restriction: participants will perform knee extension exercises under low blood flow restriction with low resistance training
3. Control group: participants will perform knee extension exercises under high resistance training without blood flow restriction.
Sessions are three times a week for 8 weeks and last about 1 hour each, including warm-up, resistance training, resting between sets, and cool-down. Leg muscle strength, muscle mass and functional performance, such as walking and balance, are measured before the intervention, after a 4-week intervention and after an 8-week intervention.

What are the possible benefits and risks of participating
The possible benefits include gaining muscular strength in the lower extremity and further improvement in functional performance. Risks include possible muscle soreness after the intervention.

Where is the study run from?
China Medical University, Taiwan (R.O.C)

When is the study starting and how long is it expected to run for?
May 2023 to July 2024

Who is funding the study?
China Medical University, Taiwan (R.O.C)

Who is the main contact?
Dr Yu-Lin You, oilfish@mail.cmu.edu.tw

Contact information

Type(s)
Public, Scientific, Principal investigator

Contact name
Dr Yu-Lin You

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Additional identifiers

Clinical Trials Information System (CTIS)
Nil known

ClinicalTrials.gov (NCT)
Nil known

Protocol serial number
Nil known

Study information

Scientific Title
Effects of an 8-week resistance training with different level of blood flow restriction on muscular strength, dynamic balance for elders

Study objectives

Greater blood flow restriction may induce greater improvement on muscular strength and functional performance

Ethics approval required
Ethics approval required

Ethics approval(s)
approved 30/05/2023, China Medical University Hospital Research Ethics Committee (2 Yude Road, Taichung, 40047, Taiwan; +886-4-22052121; irb@mail.cmuh.org.tw), ref: CMUH112-REC3-072

Study design
Randomized controlled trial

Primary study design
Interventional

Study type(s)
Other

Health condition(s) or problem(s) studied
Healthy elders

Interventions
Participants will be randomly allocated into three groups using sealed envelopes, namely high blood flow restriction, low blood flow restriction, and a control group. All participants will undergo isokinetic muscular strength of the lower extremity measurements, timed up-and-go test, and skeletal muscle mass measurement before the intervention, after a 4-week intervention and after an 8-week intervention.

The interventions for those groups:
1. High blood flow restriction: participants will perform knee extension exercises under high blood flow restriction with low resistance training
2. Low blood flow restriction: participants will perform knee extension exercises under low blood flow restriction with low resistance training
3. Control group: participants will perform knee extension exercises under high resistance training without blood flow restriction.

The level of blood flow restriction is determined by the limb occlusion pressure (LOP).

For the high blood flow restriction group, the level of blood flow restriction is set at 60% LOP, while for the low blood flow restriction group, the level of blood flow restriction is set at 30% LOP.

Intervention frequency: three times a week for 8 weeks
Duration: approximately 1 hour for a session including warm-up, resistance training, resting between sets, and cool-down.

Intervention Type
Other

Primary outcome(s)
Muscular strength of the lower extremity measured using a Biodex isokinetic dynamometer before the intervention, after a 4-week intervention and after an 8-week intervention

Key secondary outcome(s))
1. Dynamic balance measured using the timed up-and-go test before the intervention, after a 4-week intervention and after an 8-week intervention
2. Walking ability measured using the 6-meter walk test before the intervention, after a 4-week intervention and after an 8-week intervention
3. Skeletal muscle mass measured by Inbody 270 before the intervention, after a 4-week intervention and after an 8-week intervention

Completion date
15/07/2024

Eligibility

Key inclusion criteria
1. Adults aged 65-85 years old
2. Live in Taiwan
3. Without significant injuries in the last 3 months (such as fractures), open wounds on the lower extremity

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Senior

Lower age limit
65 years

Upper age limit
85 years

Sex
All

Total final enrolment
30

Key exclusion criteria
1. Musculosekeletal injuries of the lower extremity within 6 months
2. High blood pressure
3. Neural diseases, such as Parkinson's disease

Date of first enrolment

30/05/2023

Date of final enrolment
29/05/2024

Locations

Countries of recruitment
Taiwan

Study participating centre
China Medical University, Taiwan
Department of Sports Medicine
No. 100, Section 1
Jingmao Road
Beitun District
Taichung City
Taiwan
406040

Sponsor information

Organisation
China Medical University

ROR
https://ror.org/00v408z34

Funder(s)

Funder type
University/education

Funder Name
China Medical University, Taiwan

Alternative Name(s)
CMU

Funding Body Type
Private sector organisation

Funding Body Subtype
Universities (academic only)

Location
Taiwan

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study will be available upon request from Dr Yu-Lin You (oilfish@mail.cmu.edu.tw) until 04/10/2025. The personal information of all participants will be anonymized by code name.

IPD sharing plan summary
Available on request