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Enhancing balance in older adults with sensory integration training

Submission date
23/09/2024

Recruitment status
No longer recruiting

Registration date
03/10/2024

Overall study status
Completed

Last Edited
02/10/2024

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
This study investigates the effects of sensorimotor integrative resistance training combined with moderate-intensity resistance training on dual-task dynamic balance abilities in older adults, aiming to reduce fall risk and improve balance control.

Who can participate?
Older adults aged 60 to 80 years old with a Mini-Mental State Examination score of 27 or higher and unrestricted or slightly restricted joint mobility that does not affect daily activities.

What does the study involve?
Participants are randomly divided into four groups: control, medium-intensity resistance training (MIRT), low-intensity sensorimotor integrative resistance training (LIRT-SI), and medium-intensity sensorimotor integrative resistance training (MIRT-SI). The intervention consists of training sessions conducted three times per week for 16 weeks. Participants perform 4 to 6 sets of 8 to 12 repetitions per session, with intensity adjusted throughout the program. Dual-task balance tests are used to assess outcomes.

What are the possible benefits and risks of participating?
Participants may experience improvements in balance, posture control, and cognitive functions. Risks include the potential for muscle soreness or injury associated with resistance training, although precautions like supervision and heart rate monitoring minimize these risks.

Where Is the Study Run From?
The study is conducted at a community fitness center for older adults in Shanghai.

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

Who is funding the study?
Shandong Sport University, China

Who is the main contact?
Dr Haixia Li, lihaixiatutor1@163.com

Contact information

Type(s)
Public, Scientific, Principal investigator

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Study information

Scientific Title
Sensorimotor integrative resistance training improves dual-task balance abilities in older adults

Study objectives
The hypothesis for this study could be stated as:

Moderate-intensity sensorimotor integrative resistance training (MIRT-SI) improves dual-task balance abilities more effectively than traditional resistance training in older adults.

Ethics approval required
Ethics approval required

Ethics approval(s)
approved 01/12/2023, Shandong Sports University Ethics Committee (Lichen District, Jinan Shandong, 250102, China; +86 0531-89655058; chenyanglei@sdpei.edu.cn), ref: 2023030

Study design
Randomized controlled trial

Primary study design
Interventional

Study type(s)
Quality of life

Health condition(s) or problem(s) studied
Quality of life improvement in dual-task balance abilities in older adults

Interventions
In this experiment, the participants are randomly divided into four groups: control (C), medium-intensity resistance training (MIRT), low-intensity sensorimotor integrative resistance training (LIRT-SI), and medium-intensity sensorimotor integrative resistance training (MIRT-SI), with 13 individuals in each group. Randomisation is done by drawing lots.

The intervention will be conducted using SMART series sensorimotor integrative resistance training equipment at a community fitness center for older individuals in Shanghai. All participants in the intervention groups will engage in training 3 times per week for 16 weeks, with each session comprising 4 to 6 sets of 8 to 12 repetitions each. Rest periods will be 2 min between sets or 5 min between larger sets. The training intensity is maintained at 60 to 75% of the target heart rate, with load increments of 5 to 10% every four weeks. The training sessions will be supervised in person by one or two coaches. Participants in the MIRT group focused solely on performing the exercises at a set intensity. In contrast, participants in the LIRT-SI and MIRT-SI groups will be required to concentrate on controlling the speed of their movements within a specified range, while also achieving the appropriate exercise intensity. Participants in the LIRT-SI group, although engaged in low-intensity resistance training, perform sensory integration exercises that use a larger angular velocity (60°/s) than the exercises performed by participants in the MIRT-SI group (45°/s). This requires maintaining a motion speed consistent with the predefined angular velocity, thus increasing the difficulty and demanding greater concentration. Before and after each training session, the professional coaches conduct health assessments as well as warm-up activities and cool-down exercises, respectively. The intensity of the training will be dynamically adjusted in real time using a Polar heart rate monitor (Polar Electro, Kempele, Finland). Data are collected one week before the experiment began (denoted as T1) and in the 8th (T2) and 16th (T3) weeks of the intervention period. All data will be collected by the same team at the same location using consistent instruments and methods.

Intervention Type
Behavioural

Primary outcome(s)
Dual-task dynamic balance ability measured using the Dual-task 10-meter walking test (DT-10MWT) one week before the experiment begins (denoted as T1) and in the 8th (T2) and 16th (T3) weeks of the intervention period

Key secondary outcome(s))
The following Secondary outcome measures are assessed one week before the experiment begins (denoted as T1) and in the 8th (T2) and 16th (T3) weeks of the intervention period:
1. Dual-task lower-limb walking capabilities measured using the Dual-task timed up-and-go test (DT-TUGT)
2. Balance control measured using the Dual-task static balance test with a Win-pod static balance device over a 30-second test period, performed twice with a one-minute rest

Completion date
31/12/2024

Eligibility

Key inclusion criteria
1. Mini-Mental State Examination score of 27 or above
2. Unrestricted joint mobility or slight restrictions that did not affect activities of daily living

Participant type(s)
Healthy volunteer

Healthy volunteers allowed
No

Age group
Senior

Lower age limit
60 years

Upper age limit
80 years

Sex
All

Total final enrolment
52

Key exclusion criteria
1. Mini-Mental State Examination score below 27
2. Presence of severe cardiovascular or cerebrovascular diseases
3. Presence of motor disabilities or inability to perform free and voluntary movements
4. Significant joint mobility restrictions that affect activities of daily living
5. Presence of osteoarthritis

Date of first enrolment
01/01/2024

Date of final enrolment
31/03/2024

Locations

Countries of recruitment
China

Study participating centre
Community fitness centre
Zhongyuan, Jialong, and Daning neighborhoods of Yangpu District

Shanghai
China
250102

Sponsor information

Organisation
Shandong Sport University

ROR
https://ror.org/026b4k258

Funder(s)

Funder type
University/education

Funder Name
Shandong Sport University

Results and Publications

Individual participant data (IPD) sharing plan
The datasets generated during and/or analysed during the current study are/will be available upon request from Dr Haixia Li, lihaixiatutor1@163.com

IPD sharing plan summary
Available on request