

# INPLASY PROTOCOL

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**Review Stage at time of this submission:** The review has not yet started.

**Conflicts of interest:**  
None declared.

## Effect of resistance training on the elderly with muscle loss and muscle weakness

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**Review question / Objective:** Sarcopenia is a complex symptom of decreasing muscle mass and muscle strength, which leads to the decline of physical motor function in the elderly and an increase in clinical risk. Past studies have found a positive and significant effect of resistance exercise on muscle mass, muscle strength and physical performance in patients with sarcopenia. Although some studies suggest high-intensity resistance training, the pooled evidence on the effects need to be described. At the same time, what changes have been made to the body composition by resistance training needs to be discussed. From these studies, we can analyze whether resistance exercise changes more in the "quality" or "quantity" of muscles. Put forward opinions on the follow-up research. Disease type: sarcopenia. Intervention method: resistance training. Test type: randomized controlled trial.

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 01 April 2022 and was last updated on 01 April 2022 (registration number INPLASY202240008).

### INTRODUCTION

**Review question / Objective:** Sarcopenia is a complex symptom of decreasing muscle mass and muscle strength, which leads to the decline of physical motor function in the elderly and an increase in clinical risk. Past studies have found a positive and significant effect of resistance exercise on

muscle mass, muscle strength and physical performance in patients with sarcopenia. Although some studies suggest high-intensity resistance training, the pooled evidence on the effects need to be described. At the same time, what changes have been made to the body composition by resistance training needs to be discussed. From these studies, we can

analyze whether resistance exercise changes more in the "quality" or "quantity" of muscles. Put forward opinions on the follow-up research. Disease type: sarcopenia. Intervention method: resistance training. Test type: randomized controlled trial.

**Rationale:** In the past 10 years, many clinical and scientific research achievements on sarcopenia have been published in the literature, including the supplement of the definition of sarcopenia published by some expert groups Sarcopenia increases the risk of falls and fractures, reduces the ability of daily living, and is associated with heart disease, respiratory disease and cognitive impairment; It can lead to motor dysfunction, decline in quality of life, loss of independent living ability, or long-term need for other people's care, and increase the risk of death. Sarcopenia increases the risk of hospitalization, increases the nursing cost during hospitalization and increases the hospitalization expenses. Therefore, we need effective means to prevent and treat sarcopenia. Resistance training has been proved to be a good method. We will make a meta-analysis on the application of resistance training in the elderly with muscle loss and muscle weakness.

**Condition being studied:** Effect of resistance training on the elderly with muscle loss and muscle weakness.

## METHODS

**Search strategy:** Web of science; embase; pubmed; Cochrane library.

Pubmed=131

Search: (("Sarcopenia"[Mesh]) OR (Sarcopenias[Title/Abstract]) OR (sarcopenic[Title/Abstract])) AND (randomized controlled trial[Publication Type] OR randomized[Title/Abstract] OR placebo[Title/Abstract]) AND (((("Resistance Training"[Mesh]) OR (((((((((((((((((((((((Training, Resistance[Title/Abstract]) OR (resistance exercise[Title/Abstract])) OR (resistance exercises[Title/Abstract])) OR (Strength Training[Title/

Abstract])) OR (Training, Strength[Title/Abstract])) OR (Weight-Lifting Strengthening Program[Title/Abstract])) OR (Strengthening Program, Weight-Lifting[Title/Abstract])) OR (Strengthening Programs, Weight-Lifting[Title/Abstract])) OR (Weight Lifting Strengthening Program[Title/Abstract])) OR (Weight-Lifting Strengthening Programs[Title/Abstract])) OR (Weight-Lifting Exercise Program[Title/Abstract])) OR (Exercise Program, Weight-Lifting[Title/Abstract])) OR (Exercise Programs, Weight-Lifting[Title/Abstract])) OR (Weight Lifting Exercise Program[Title/Abstract])) OR (Weight-Lifting Exercise Programs[Title/Abstract])) OR (Weight-Bearing Strengthening Program[Title/Abstract])) OR (Strengthening Program, Weight-Bearing[Title/Abstract])) OR (Strengthening Programs, Weight-Bearing[Title/Abstract])) OR (Weight Bearing Strengthening Program[Title/Abstract])) OR (Weight-Bearing Strengthening Programs[Title/Abstract])) OR (Weight-Bearing Exercise Program[Title/Abstract])) OR (Exercise Program, Weight-Bearing[Title/Abstract])) OR (Exercise Programs, Weight-Bearing[Title/Abstract])) OR (Weight Bearing Exercise Program[Title/Abstract])) OR (Weight-Bearing Exercise Programs[Title/Abstract]))))

Embase 344

#1 'sarcopenia'/exp OR sarcopenia

#2 'sarcopenias':ab,ti OR 'sarcopenic':ab,ti

#3= #1 OR #2

#4 'resistance training'/exp

#5 'resistance training':ab,ti OR 'training, resistance':ab,ti OR 'resistance exercise':ab,ti OR 'resistance exercises':ab,ti OR 'strength training':ab,ti OR 'training, strength':ab,ti OR 'weight-lifting strengthening program':ab,ti OR 'strengthening program, weight-lifting':ab,ti OR 'strengthening programs, weight-lifting':ab,ti OR 'weight lifting strengthening program':ab,ti OR 'weight-lifting strengthening programs':ab,ti OR 'weight-lifting exercise program':ab,ti OR 'exercise program, weight-lifting':ab,ti OR 'exercise programs, weight-lifting':ab,ti OR 'weight lifting exercise program':ab,ti OR 'weight-lifting exercise programs':ab,ti OR 'weight-bearing strengthening program':ab,ti OR

'strengthening program, weight-bearing':ab,ti OR 'strengthening programs, weight-bearing':ab,ti OR 'weight bearing strengthening program':ab,ti OR 'weight-bearing strengthening programs':ab,ti OR 'weight-bearing exercise program':ab,ti OR 'exercise program, weight-bearing':ab,ti OR 'exercise programs, weight-bearing':ab,ti OR 'weight bearing exercise program':ab,ti OR 'weight-bearing exercise programs':ab,ti

#6= #4 OR #5

#7 'randomized controlled trial':ab,ti OR 'randomized':ab,ti OR 'placebo':ab,ti OR 'rct':ab,t

#8= #3 AND #6 AND #7

Web of science 637

((TS=(Sarcopenia OR Sarcopenias OR Sarcopenic)) AND TS=(Resistance training OR Training, Resistance OR resistance exercise OR resistance exercises OR Strength Training OR Training, Strength OR Weight-Lifting Strengthening Program OR Strengthening Program, Weight-Lifting OR Strengthening Programs, Weight-Lifting OR Weight Lifting Strengthening Program OR Weight-Lifting Strengthening Programs OR Weight-Lifting Exercise Program OR Exercise Program, Weight-Lifting OR Exercise Programs, Weight-Lifting OR Weight Lifting Exercise Program OR Weight-Lifting Exercise Programs OR Weight-Bearing Strengthening Program OR Strengthening Program, Weight-Bearing OR Strengthening Programs, Weight-Be.

**Participant or population:** The elderly with muscle loss and muscle weakness.

**Intervention:** Resistance training.

**Comparator:** Routine training or placebo.

**Study designs to be included:** RCT.

**Eligibility criteria:** The elderly with muscle loss and muscle weakness.

**Information sources:** Web of science; Embase; Pubmed; Cochrane library.

**Main outcome(s):** Total of articles were considered for the final selection, 15 studies reported the effects of different

loads on patients with sarcopenia, 14 studies shown the effects of different speed on sarcopenia and 15 studies involved different exercise frequencies. Compared with medium frequency, low-moderate load and moderate speed training, high-frequency, high load and high-speed training have slight advantages in muscle mass, muscle strength and physical performance but no significant effect of them is found. All studies emphasize the importance of long-term training.

**Additional outcome(s):** Through subgroup analysis, we will find out the changes of body composition and strength caused by resistance exercise.

**Data management:** Stata.

**Quality assessment / Risk of bias analysis:** Cochrane.

**Strategy of data synthesis:** Through Revman software and Stata software, the different indexes of resistance movement improvement in the study are analyzed, including: muscle mass, repetition maximum testing, skeletal muscle mass index et.

**Subgroup analysis:** Including: muscle mass, repetition maximum testing, skeletal muscle mass index. From the analysis of different subgroups, the therapeutic effect of resistance exercise and the changes of muscle strength and body composition of patients were obtained.

**Sensitivity analysis:** After transforming the random effect model and the fixed effect model, the sensitivity analysis results of the two models are compared.

**Language:** English.

**Country(ies) involved:** China.

**Other relevant information:** At present, we need to complete the data collection and final analysis.

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**Keywords:** Physical exercise, Aging, Resistance Exercise, Sarcopenia.

**Dissemination plans:** A paper published in an English journal.

**Contributions of each author:**

**Author 1 - Ruiren Wu -** Author 1 drafted the manuscript.

Email: 1026373270@qq.com

**Author 2 - Kunpeng Li -** The author provided statistical expertise and drafted the manuscript.

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**Author 3 - Wu Wang -** The author contributed to the development of the selection criteria, and the risk of bias assessment strategy. The author provided statistical expertise.

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