

INPLASY PROTOCOL

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None declared.

INTRODUCTION

Review question / Objective: This systematic review aimed to: (1) summarize the studies that have examined the determine the effects of high intensity interval training on muscle strength in older adults as an element of prevention and

EFFECTS OF HIGH-INTENSITY INTERVAL TRAINING ON MUSCLE STRENGTH FOR THE PREVENTION AND TREATMENT OF SARCOPENIA IN ELDERLY ADULTS

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Review question / Objective: This systematic review aimed to: (1) summarize the studies that have examined the determine the effects of high intensity interval training on muscle strength in older adults as an element of prevention and treatment of sarcopenia. Summarize the studies that have examined the determine the effects of high intensity interval training on muscle strength in older adults as an element of prevention and treatment of sarcopenia.

Condition being studied: Physical performance of older adults exposed to high intensity interval training on muscle strength.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 20 January 2023 and was last updated on 20 January 2023 (registration number INPLASY202310069).

treatment of sarcopenia. Summarize the studies that have examined the determine the effects of high intensity interval training on muscle strength in older adults as an element of prevention and treatment of sarcopenia.

Rationale: Aging is accompanied by a series of changes, among which are the decrease in strength and muscle mass. High-intensity interval training is an exercise modality that has functional, cardiorespiratory and musculoskeletal benefits in older adults.

Condition being studied: Physical performance of older adults exposed to high intensity interval training on muscle strength.

METHODS

Search strategy: Keywords and synonyms were entered in various combinations in the title, abstract or keywords: (Sarcopenia) AND (“high-intensity interval training” OR “HIIT” OR “high-intensity interval” OR “interval training”) AND (“muscle strength” OR “strength”) AND (prevention) AND (treatment).

Participant or population: Older adults, with normal vision and no history of neuropsychological impairment.

Intervention: High-intensity interval training protocols.

Comparator: Control conditions (passive control).

Study designs to be included: Counterbalanced cross-over design. RCT and non-RCT.

Eligibility criteria: 1) older adults (<65 years) from any sex with no injury or illness, with normal vision, no partial/chronic injury or illness and no history of neuropsychological impairment.; (2) high-intensity interval training protocols conducted in one of the two possible conditions; (3) Control conditions; (4) muscle strength. (5) Counterbalanced cross-over design (randomized and non-randomized can be included, since all revealing no significant differences in control conditions); (6) Only original and full-text studies written in English. **Exclusion criteria:** (1) Other population than older adults or older adults with special

conditions (e.g., injury, treatment, illness, diseases); (2) other training protocols; (3) Other intervention conditions than passive, namely active control (e.g., massage); (4) Other physiological or physical conditions not related to the included outcomes; (5) Other study designs that do not allow comparisons within-subjects for the two conditions; (6) Written in other language than English. Other article types than original (e.g., reviews, letters to editors, trial registrations, proposals for protocols, editorials, book chapters and conference abstracts).

Information sources: Electronic databases (PubMed, Scopus, SPORTDiscus, and Web of Science) were searched for relevant publications prior to 12 January 2023.

Main outcome(s): Muscle strength.

Data management: A data extraction was prepared in Microsoft Excel sheet (Microsoft Corporation, Readmon, WA, USA) in accordance with the Cochrane Consumers and Communication Review Group’s data extraction template. The Excel sheet was used to assess inclusion requirements and subsequently tested for all selected studies.

Quality assessment / Risk of bias analysis: The quality assessment standard for a cross-over study was used. This tool assesses nine items: (i) appropriate cross-over design; (ii) randomized treatment order; (iii) carry-over effect; (iv) unbiased data; (v) allocation concealment; (vi) blinding; (vii) incomplete outcome data; (viii) selective outcome reporting; and (ix) other bias. A possible scoring of low, unclear, and high can be provided by each item.

Strategy of data synthesis: Analysis and interpretation of results in this systematic review were only conducted in the case of at least study groups provided scientific evidence found in previous literature regarding the effect of high intensity interval training on muscle strength in older adults as an element of prevention and treatment of sarcopenia.

Subgroup analysis: Fitness status; Age; Sex.

Sensitivity analysis: To adjust for publication bias, a sensitivity analysis was conducted using the trim and fill method, with LO as the default estimator for the number of missing studies.

Language restriction: English.

Country(ies) involved: Spain and Turkey.

Other relevant information: There is sufficient evidence to confirm that HIIT training improves in functional and cardiorespiratory capacity, in body composition and benefits on muscle strength, increases architecture and muscle quality, and is associated with muscle hypertrophy in older adults.

Keywords: Sarcopenia; elderly; aging; high-intensity interval training; muscular strength.

Contributions of each author:

Author 1 - Jose Alfonso Morcillo Losa - Lead the project, performed the search and methodological search and made the synthesis of results. Wrote and revised the manuscript.

Author 2 - María del Pilar Díaz Martínez - Performed the methodological search, search and methodological search and made the synthesis of results.

Author 3 - Halil Ibrahim Ceylan - Wrote and revised the manuscript.

Author 4 - Beatriz Moreno Vecino - Wrote and revised the manuscript.

Author 5 - Francisco Tomás González Fernández -Wrote and revised the manuscript.

Author 6 - Juan Parraga Montilla - Wrote and revised the manuscript.