INPLASY

An umbrella review of resistance training to promote increases in muscle function and hypertrophy

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ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Formal screening of search results against eligibility criteria.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202360071

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 24 June 2023 and was last updated on 24 June 2023.

INTRODUCTION

Review question / Objective The proposal is to undertake a structured, systematic umbrella review of systematic reviews and meta-analyses that have included randomized controlled trials (RCT) of resistance training (RT) and to identify Frequency, Intensity, Type and Time (FITT) principles that lead to the largest effects.
PICO Questions for An umbrella review of resistance training to promote increases in muscle function and hypertrophy.
Does chronic RT (I), compared to a comparator group (C), increase muscular strength, power, endurance, contraction velocity and hypertrophy (muscle biopsy, ultrasound, MRI, CT, DXA, BIA, creatinine, D3-Cr) (O) among younger (> 18yr) and older (> 55yr) adults (P)?
The influence of resistance training (RT) program variables (Frequency [training session per week], Intensity [load, work to fatigue], Type [free weight, machine-guided], Time [under tension, high/low velocity]) in promoting gains in strength (variously measured), power, endurance, contraction velocity and hypertrophy in younger (18-55) adults.

Rationale There are numerous systematic reviews of resistance training manipulating a multitude of training-related variables. The most effective prescription to promote gains in strength and hypertrophy is unknown.

Condition being studied Resistance Training.

METHODS

Participant or population Adults >18 years.

Intervention Resistance training.

Comparator Control (no resistance exercise) OR an alternative prescription for resistance exercise.

Study designs to be included Systematic reviews.

Eligibility criteria Subject > 18 years, but less than 55 or >55 (two age classifications); apparently-healthy or with no defined disease(s); RT interventions encompassing at least (lower limit) 6wk, with 2 sessions per week (12 exposures), with no upper limit; any RT status (novice or trained); employed, as a comparator: non-exercise control, other exercise control conceived of as sham (i.e., stretching, callisthenics), or other (note of what); contained any aspect of the FITT (see above) of the RT intervention; reported pre-and post-intervention strength (or at least one outcome related to muscle function) or hypertrophy data for both the RT and comparator arm(s); if a supplement or nutritional intervention or other co-intervention (e.g., behavioural therapy, medication, counselling) is applied, it must be received by intervention and comparator groups.

Information sources Databases of publications MEDLINE, Embase, Emcare, SPORTDiscus, CINAHL, and Web of Science.

Main outcome(s) Strength (any test), power, endurance, and hypertrophy (muscle mass gain) as measured using the methods described.

Data management Papers screened in Rayyan https://www.rayyan.ai/ Data extracted into customized data-sheets.

Quality assessment / Risk of bias analysis Consensus Analysis Strategy
1. All reviews will be scored using the AMSTAR (A Measurement Tool to Assess Systematic Reviews) tool (Shea et al. BMC Med Res Methodol.2007;7:10). This 11-item tool assesses the degree to which review methods avoided bias. The methodological quality is rated as high (score 8–11), moderate (score 4–7) or low (score 0–3).
2. The quality of the evidence (QoE) supporting each bottom-line statement will be rated by using a method based on the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach for primary evidence (1 - very low; 2 - low; 3 - moderate; 4 - high). This method considers study design (meta-analysis: yes or no) and AMSTAR rating of the included systematic reviews.

Strategy of data synthesis To organize the evidence, the authors will systematically synthesize the extracted data of each review. This results in standardized effectiveness statements (i.e., sufficient evidence, some evidence, insufficient evidence, insufficient evidence to determine) about the treatment effect of the interventions in the individual systematic reviews. See (https://onlinelibrary.wiley.com/doi/10.1002/jcsm.13030) "An umbrella review of systematic reviews of β-hydroxy-β-methyl butyrate supplementation in ageing and clinical practice" for more details.

Subgroup analysis Younger (18-55) and older (>55) persons.

Sensitivity analysis None planned.

Language restriction English reviews only.

Country(ies) involved Canada, United states, Australia.

Other relevant information This review is undertaken on behalf of ACSM.

Keywords resistance training, muscle, strength, power.

Dissemination plans Presentation and publication.

Contributions of each author
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