INPLASY PROTOCOL

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Conflicts of interest:
None.

The effects of exclusively resistance training-based programs in people with depression: A systematic review and meta-analysis of randomized controlled trials

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Review question / Objective: **Our aim is to study the effects of resistance training programs per se in depression.**
Condition being studied: **Depression.**
Information sources: **The following databases were used to search and retrieve the articles: Cochrane Library, EBSCO (APA PsycArticles, Academic Search Ultimate, APA PsycInfo, Psychology and Behavioral Sciences Collection), PEDro, PubMed (includes MEDLINE), Scopus and Web of Science.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 02 July 2020 and was last updated on 02 July 2020 (registration number INPLASY202070004).

INTRODUCTION

Review question / Objective: **Our aim is to study the effects of resistance training programs per se in depression.**

Rationale: **Previous meta-analyses have summarized the effects of exercise in people with depression. However, the majority of trials, which have examined the antidepressant effects of exercise, have used aerobic exercise or combined exercise modalities. Although findings concerning the antidepressant effects of resistance training are positive, only limited research has focused on this modality.**

Condition being studied: Depression.

METHODS

Search strategy: The following databases were used to search and retrieve the articles: Cochrane Library, EBSCO (APA PsycArticles, Academic Search Ultimate, APA PsycInfo, Psychology and Behavioral Sciences Collection), PEDro, PubMed (includes MEDLINE), Scopus and Web of Science. The search was conducted in late June 2020. Search protocol required the title to contain the words depression OR depressive OR dysthymia. Furthermore, the title, abstract or keywords had to contain the words or expressions: (i) "randomized controlled trial"; AND (ii) "strength training" OR "resistance training" OR "resisted training" OR "weight training". No limitations were established for publication date, and in press articles were considered. For Cochrane Library, only trials were considered. For EBSCO, title and abstract have to be searched separately, and therefore we chose to search (i) "randomized controlled trial"; AND (ii) "strength training" OR "resistance training" OR "resisted training" OR "weight training" without any limitations in field. For PubMed, combined search only afforded selecting Title/Abstract, not Keywords. The same was valid for PEDro, besides only affording one field at a time. Therefore, multiple searches were needed in PEDro. In addition, the criterion of "clinical trial" was selected, therefore automatically excluding practice guidelines and systematic reviews. In Web of Science, the combination of title, abstract and keywords was termed "Topic".

Participant or population: Population with depression.

Intervention: Resistance training.

Comparator: Control or parallel (aerobic training or combined).

Study designs to be included: Randomized controlled trials or parallel studies.

Eligibility criteria: Articles were eligible if they were published or in press in a peer-reviewed journal, with full-text in English language. No limitations were placed regarding publication date, and articles in press were considered. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were adopted (Moher, Liberati, Tetzlaff, & Altman, 2009). P.I.C.O.S. was established as follows: (i) participants were humans with diagnosed with any form of depression according to DSM-5® (American Psychiatric Association, 2013), ICD-11 (World Health Organization, 2018) or other properly validated scale (e.g., (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Hamilton, 1980; Yesavage, 1988)), but without other major disease (e.g., Parkinson, Alzheimer, cancer, dementia); (ii) only supervised exclusively resistance training-based interventions were considered, with minimal warm-up activities outside the scope of the main exercise mode; Comparators were control groups not performing any training protocol and/or supervised contrast groups also performing an alternative exercise program (i.e., yoga, stretching, aerobic exercise); Outcomes were any effects on performance, health and quality of life; Study design was limited to randomized controlled trials (RCTs).

Information sources: The following databases were used to search and retrieve the articles: Cochrane Library, EBSCO (APA PsycArticles, Academic Search Ultimate, APA PsycInfo, Psychology and Behavioral Sciences Collection), PEDro, PubMed (includes MEDLINE), Scopus and Web of Science.

Main outcome(s): Primary outcomes: (i) mean change in depressive symptoms in the exercise group assessed by any validated scale, from baseline to post-intervention, in comparison with the mean change of the control group, calculated as the SMD together with 95% confidence intervals (CIs); (iv) adherence rates to the training protocol. If an author reported the results of two outcome measures meeting our criteria (i.e. mean change/pre and

posttest change in depressive symptoms according to two different measures), we used the primary outcome chosen by the author. If this was not clear, we used the HAMD or the BDI in order to increase homogeneity in our results. These outcome measures were also prioritized since they are commonly used in the exercise and depression literature (Cooney et al., 2013).

Additional outcome(s): Secondary outcomes: (i) physical (e.g., performance tests, body composition, perceived exertion); (ii) psychosocial (e.g. body image and appearance, reporting of positive or negative feelings, self-esteem, cognitive evaluations, memory and concentration tasks).

Quality assessment / Risk of bias analysis: The revised Cochrane risk-of-bias tool for randomized trials (RoB 2) was applied to evaluate the individual studies, considering its five dimensions: bias arising from the randomization process, bias due to deviations from intended interventions, bias due to missing outcome data, bias in measurement of the outcome and bias in selection of the reported result. JA and FMC completed the risk-of-bias evaluation in an independent fashion. After completion of the first coding, the tables were compared and all disagreements were discussed with all the authors of the manuscript and reanalyzed until consensus was achieved.

Strategy of data synthesis: (i) sample size and general characteristics (e.g., age, sex/gender, physical activity habits); (ii) duration and characteristics of the intervention; (iii) reported medication taken by the participants; (iv) main outcomes; (v) pre and post results.

Subgroup analysis: Possibly between intervention duration.

Sensibility analysis: The extended Egger's test [36] will be used to assess the risk of bias across the studies. With the purpose of reducing the risk of heterogeneity, a sensitivity analyses will be executed aiming to determine the robustness of the summary estimates.

Language: English.

Country(ies) involved: Portugal; Chile; Poland.

Keywords: Depressive; mental health; exercise; strength training.

Contributions of each author:
Author 1 - Lara Carneiro - Writing the introduction, discussion and conclusions. Revised and approved the final draft.
Author 2 - José Afonso - Methodology and results. Revised and approved the final draft.
Author 3 - Rodrigo Ramirez-Campillo - The author provided statistical expertise and made the quantitative analysis. Revised and approved the final draft.
Author 4 - Eugenia Murawska-Ciałowciz - The author will read, provide feedback and approve the final manuscript.
Author 5 - Filipe Manuel Clemente - Methodology and results. Revised and approved the final draft.