INPLASY PROTOCOL

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Conflicts of interest:
None declared.

METHODOLOGICAL CONSIDERATIONS FOR DETERMINING THE VOLUME AND INTENSITY OF DROP JUMP TRAINING. A SYSTEMATIC, CRITICAL AND PROPOSITIVE REVIEW

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Review question / Objective: **Considering the lack of consensus about the plyometric training, it seems justified to systematize the existing criteria for the volume and intensity in the scientific literature. This knowledge may allow more precise monitoring of training load and provide valuable indications for professionals. Therefore, the purpose of this systematic review was to collate and evaluate the criteria for determining the volume and intensity of drop jumps in the available literature.**
Condition being studied: **Determination of the intensity of the exercise in plyometric training, the intensity scales applied in different sports, ways of determining the intensity and procedures of the studies for the determination of the intensity.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 17 February 2021 and was last updated on 06 March 2023 (registration number INPLASY202120051).

INTRODUCTION

Review question / Objective: **Considering the lack of consensus about the plyometric training, it seems justified to systematize the existing criteria for the volume and intensity in the scientific literature. This knowledge may allow more precise monitoring of training load and provide valuable indications for professionals. Therefore, the purpose of this systematic review was to collate and evaluate the**

criteria for determining the volume and intensity of drop jumps in the available literature.

Rationale: Different attempts to define the intensity scales of plyometrics have been published in peer review periodic (Andrade et al., 2020; Jarvis et al., 2016; Van Lieshout et al., 2014). For Jarvis et al. (2016) the quantification of the intensity of plyometric exercise is ill defined. This has led to different authors (Andrade et al., 2020; Jarvis et al., 2016; Van Lieshout et al., 2014) to apply some intensity scales with different criteria for the maximum and minimum determination of intensity with unequal procedures. Therefore, the prevalence of these intensity scales and their practical applicability can help shape the future of different sports that use lower limbs power training.

Condition being studied: Determination of the intensity of the exercise in plyometric training, the intensity scales applied in different sports, ways of determining the intensity and procedures of the studies for the determination of the intensity.

METHODS

Search strategy: Keyword selection was determined by experts and included: ("Training with adults" OR "Training with athletes" OR "Training with youth" OR "Program with adults" OR "Program with athletes" OR "Program with youth" OR "Effect*") AND ("Vertical Jump" OR "Plyometric*" OR "Drop Jump" OR "Depth jump"). Accounts were created in each database, automatically generating emails for information on new papers. These were received as available and were subject to the review process until the end of the study on the 23rd of December 2022.

Participant or population: Trained and untrained adults, youth and children. Gender will not be taken into account.

Intervention: It incorporated a PJT program with DJ with rebounding or countermovement. DJ with free arms. Isolated or combined. No overload. Paired control groups or experimental and control groups. Including pretest and posttest.

Comparator: Passive or active control group comparisons during a plyometric training program.

Study designs to be included: Randomized controlled trials incorporating PJT both parallel, crossover, and cluster with more than 4 weeks and no limitation of completion. Original, peer-reviewed research in the English language.

Eligibility criteria: Athletes between the ages of 16 and 40. Of either sex. Experienced and inexperienced subjects in plyometric training.

Information sources: The searches were carried out from the beginning of the indexing of the databases until the 10th of September 2022. The databases searched were PubMed, SPORTDiscus, Web of Science and, Scopus. Regulatory database records were used. We also contacted experts who provided papers that were not included and met the inclusion criteria. Reference searching of study citations was used as a source of information to detect potentially eligible studies.

Main outcome(s): A total of 31495 studies were identified in the databases and exported to the bibliographic reference management software (EndNote TM X9, Clarivate Analytics, Philadelphia, PA, USA). A total of 23513 studies were automatically removed as duplicates, and a further 831 studies were manually removed as duplicates. The remaining studies (7151) were screened by title and abstract, taking into account the inclusion and exclusion criteria and then their relevance, resulting in the elimination of further 6863 studies. A total of 288 studies were eligible for full-text review. Once the full-text review was completed, 266 studies were excluded based on the following criteria: participants (71), intervention (47), comparison (36), outcomes (14), and study design (98). Thus, a total of (22) were included in the review for critical review

Additional outcome(s): The RCT included in this review recruited groups of physical education students and recreationally active individuals (n= 8), moderately trained cross-country athletics groups (n= 4), national level Football groups (n= 4), national level Handball groups (n= 2), national level Basketball groups (n= 2). The remaining groups were Rugby, Fencing, Volleyball and untrained subject. This amounted to 686 recruited individuals, of which n= 337 were intervened with DJ and DeJ training. The mean age of all participants was 25.79 ± 4.76 years, but it is worth noting that one study (83) did not present the age of the participants, only reporting that they were university students. Although it can be inferred that they were between 18 and 25 years old, the study was excluded from the calculation of the mean age. Of the 22 included RCTs, six groups presented results with women only, 15 presented results with men only, and the remaining 4 presented a mixed study. The duration of plyometric training programs ranged from 4 to 12 weeks, while training frequencies were between 1 and 4 times per week. Twenty-one of the 22 included studies did not present a selection criterion for individual HF in the procedure. Twenty-one of the 22 included studies standardized the height of the fall. The 22 included studies did not present a procedure criterion for the selection of the plyometric work volume. Thus, 18 of the included studies present a variation of the training volume without methodological justification, and the remaining seven do not explain why they maintain the same work volume during all the weeks of training. The type of landing surface is not reported in 10 studies, and two others are considered unclear. The objectives and main results of the included studies are detailed in table 4, while table 5 shows the general characteristics of the studies in this systematic review.

Quality assessment / Risk of bias analysis: Three researchers will independently perform the risk of bias assessment of the articles using the PEDro scale. In case of disagreement, they will be discussed with all the authors and if necessary, another expert on the subject will be included.

Strategy of data synthesis: The data of the results will be synthesized based on a qualitative approach around: the authors, name of the study, type of research, characteristics of the population, country where it is carried out, intensity criterion used, procedure, main results and important observations. Risk ratios or standardised mean differences will be calculated to provide a summary of intervention effects for each study.

Subgroup analysis: If necessary, we differentiate the results by sex and age.

Sensitivity analysis: No sensitivity analysis will be performed for this study.

Language: English.

Country(ies) involved: Portugal, Italy, Spain and Cuba.

Keywords: Drop Jump, Depth Jump, jumping program, plyometric training, drop jumps, plyometrics.

Contributions of each author:

Author 1 - Raynier Montoro Bombú[1] - Selected titles, abstracts and full text regardless of the corresponding author. It contributed to the inclusion criteria, data extraction and risk of bias.
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