

INPLASY

To shock or not to shock the ground during seated vertical jump. A systematic review

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Van Hout, L; Malico-Sousa, P; Pinheiro, V; Costa, A; Montoro, R.

Corresponding author:

Laura Van Hout

lauranvanhout@gmail.com

Author Affiliation:

ISCE—Polytechnic University of Lisbon and Tagus Valley, Department of Sport Sciences, 2620-379 Lisbon, Portugal.

ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Data analysis.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202520009

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 2 February 2025 and was last updated on 2 February 2025.

INTRODUCTION

Review question / Objective The vertical jump from a seated position eliminates the assistance of a countermovement and the need for a paused initial position, maximizing the training of the rate of force development. This exercise produces the same effect as the box jumps from a seated position, but without the risk or fear associated with jumping onto a box, and allows for a more balanced push through the foot. However, there is currently no review supporting the effects of hitting or not hitting the ground during the execution of this jump. In this context, our research aimed to systematize the impact of hitting or not hitting the ground during the vertical jump from a static position.

Population: All male and female athlete populations;

Seated vertical jump, with high leg activation, low leg activation, and no movement before the jump;

Outcome: jump height (measured in cm); System: jumps on the strength platform and analysis of the results on the ANOVA platform.

Rationale The vertical jump from a seated position is a way to train the jump using only a concentric movement. By eliminating a countermovement and the pretension that would exist if only stopping at the bottom of a countermovement, the assistance of elasticity is removed, which increases the rate of force development. This exercise produces the same effect as the box jumps from a seated position, but without the risk or fear associated with jumping onto a box, and allows for a more balanced push through the foot.

Box jumps from a seated position can be performed at the beginning or end of a training session. Generally, 3 to 6 sets of 3 to 5 repetitions are used. However, knowing whether to hit or not hit the ground during the execution of this jump can be crucial for coaches and athletes. It is important to investigate studies that have analyzed this jump and measured maximum force, rate of force development, power, and jump height using force platforms.

Condition being studied Differences between pre-jump leg movement and jump biomechanics

due to ground contact time and force generated to push the body upwards, Rate of force development power.

METHODS

Search strategy The search will be performed on all fields using the following keywords:

Seated vertical jump* or Seated box jump* or standard box jump* or vertical jump seated.

Participant or population Federated athletes from various sports, without injury, illness, or other clinical conditions.

Intervention All the interventions that perform the box jump and its different jumping variations from a seated position to a vertical jump.

Comparator Hitting the ground vs. not hitting the ground.

Study designs to be included Randomized controlled trials, observational studies, and experimental studies.

Eligibility criteria

Inclusion Criteria

Healthy populations, athletes of different modalities. Gym populations. No age or sex restrictions.

Exclusion criteria

Population with rehabilitation interventions, Studies from case analyses. Studies not written in English.

Information sources Electronic databases (Medline (PubMed), Scopus, and Web of Science) and EBSCO were searched for relevant publications.

Main outcome(s) Jump height measured in cm, ground contact time, and comparison of different leg movement techniques and their relationship to jump height and power, rate force development, and impulse.

Quality assessment / Risk of bias analysis The search for relevant publications was conducted in electronic databases, including Medline (PubMed), Scopus, and Web of Science. The quality assessment of the included studies will be conducted using the Cochrane Risk of Bias Tool for randomized controlled trials and the Newcastle-Ottawa Scale for observational studies. The following criteria will be analyzed: participant selection, ensuring that included studies recruit federated athletes without injuries or clinical

conditions; data completeness, assessing potential attrition bias due to missing data or loss to follow-up; and conflicts of interest, identifying possible sources of bias related to funding or author affiliations. The quality of the studies will be evaluated by two independent reviewers, and in case of disagreement, a third reviewer will be consulted.

Strategy of data synthesis The extracted data will be analyzed using the ANOVA platform, comparing different levels of leg activation in the seated vertical jump. The data synthesis strategy will include analysis if the studies present homogeneous data (same unit of measurement and similar experimental conditions), and narrative synthesis if there is substantial variability across studies, describing observed trends. Statistical analysis will involve calculating standardized mean effects (Cohen's d) to compare different leg movement techniques and their impact on jump height.

Subgroup analysis Sport type, competitive level, and jump technique.

Sensitivity analysis This study analysis includes PICO and Sensitivity analysis.

Language restriction English.

Country(ies) involved Portugal.

Keywords Seated vertical jump, Seated box jump, Standart box jump vertical jump seated reactive force; power.

Contributions of each author

Author 1 - Laura Van Hout - FMC led the project, wrote and revised the original manuscript, and RRC analyzed and interpreted the data, wrote the statistical report, and revised the original manuscript.

Email: lauranvanhout@gmail.com

Author 2 - Paulo Malico-Sousa - Run the data search, performed the methodological assessment, conducted the data extraction, wrote and revised the original manuscript.

Email: direccaoddesporto@isce.pt

Author 3 - Valter Pinheiro - Run the data search, performed the methodological assessment, conducted the data extraction, wrote and revised the original manuscript.

Email: prof_valterpinheiro@hotmail.com

Author 4 - Armando Costa - Run the data search, performed the methodological assessment, conducted the data extraction, wrote and revised the original manuscript.

Email: acosta_isce@hotmail.com
Author 5 - Raynier Montoro - RMB analyzed and interpreted the data wrote the statistical report, and revised the original manuscript.
Email: rayniermb@gmail.com