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21 UNDERGRADUATE RESEARCH CRITIQUE

Research Critique on "A Comparison of Velocity-Based and Traditional Percentage-Based Loading Methods on Maximal Strength and Power Adaptations"

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ABSTRACT

Introduction: This study explored the differences between percentage and velocity-based training (PBT and VBT) and neuromuscular connection. The exercises used in this test were the back squat, bench press, overhead press, deadlift, vertical jump, and countermovement exercises; these exercises influence neuromuscular stimuli adaptation to resistance training. This study is vital to explore how VBT might be better than PBT for power production and strength improvement.

Purpose/objective: This study aimed to determine if VBT yielded better strength adaptations in a 6-week resistance training program compared with a traditional PBT program.

Methods: 30 resistance trained men volunteered to participate in this study, assuming that they had at least two prior years of training experience and had been consistently training the last six months. Sixteen men were recruited to participate who met the inclusion criteria. Pre-testing before the study included a countermovement jump (CMJ) test and 1 repetition maximum (RM) testing of the back squat, bench press, overhead press, and deadlift. All 16 men (22.8$\pm$4.5 years of age) underwent 6 weeks of resistance training at two sessions per week. Half of the subjects were assigned to VBT, and the other half were assigned to a traditional PBT program. After completing the training program, participants underwent the same testing protocol as before the 6-week program.

Results: No differences between groups were found at the beginning of testing before the 6-week program ($p > 0.05$). However, after 6 weeks of resistance training, the VBT group had a better improvement (5%) in the CMJ test than the PBT group (1%) ($p < 0.05$). In the 1RM tests, there were significant increases in strength for the overhead press (VBT and PBT both 6%), back squat (VBT 9%, PBT 8%), deadlift (VBT 6%), and bench press (VBT 8%, PBT 4%) ($p < 0.05$). No significant time relationship was

found between groups for the back squat, deadlift, and overhead press ($p > 0.05$). A significant time relationship was found between groups for the bench press ($p < 0.05$). Furthermore, the VBT group outlifted the PBT group significantly on the back squat, overhead press, and bench press ($p < 0.05$).

Conclusion: The result data presented within this study suggests that using velocity as a training variable may provide greater maximal strength adaptations than traditional PBT loading. Furthermore, a lower total training volume is necessary to improve maximal strength considerably, and more pertinent to the quality of training, allow a favorable adaptation effect to movements including vertical jump.

Critique: This study found that VBT yielded better and faster performance improvements in the CMJ test and all 1RM strength tests. The overall design and methods of the analysis were well organized, but there were a few changes that could have been made. There were initially 30 male subjects who participated in the study, but 16 subjects did not qualify, so 16 more were recruited. The study didn't mention how the authors recruited these subjects, so there is potential for bias in this selection. Furthermore, there was no indication of the athletes' sports background before the study, so it is possible that some athletes had a natural advantage over others due to prior training. Another problem in this study was the exercises selected for the six-week training program. While the overhead press, back squat, deadlift, and overhead press are all straightforward movements to learn, this study compared VBT to PBT. It would have been ideal to include power movements in the athletes' training, such as power cleans, jerks, snatches, and/or broad jumps and plyometrics. It would have also been more balanced to include seated rows or lat pulldowns to work the back. This study included a lot of pressing motions and lacked in pulling movements. Another weak aspect of this study was the lack of inclusion of women. A follow-up study with female subjects would be an excellent comparison to the male subjects' results.

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