

A Novel Eccentric Resistance Training Strategy to Maximize Exercise-Induced Muscle Damage

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ABSTRACT

Exercise-induced muscle damage is one of the primary stimuli for muscle growth. **PURPOSE:** Test whether a novel strategy for very fast eccentric chest press will induce lower strength/power outputs from pre and post testing, indirectly assuming higher exercise-induced muscle damage than slow eccentric chest press. **METHODS:** Seven healthy college students (4 men, 3 women) with a history of resistance training, but not currently training more than once per week, enrolled for this study. Each participant completed a familiarization trial in which they were tested for maximal voluntary isometric contraction (MVIC) on the chest press and then practiced loading according to the fast and slow conditions. In the fast condition, participants were instructed to allow the weight to accelerate before catching it before it touched the chest. In both conditions, research assistants lifted the weight for the concentric part of the lift. After a two-week recovery, participants were randomized into either the fast or slow condition. Following a two-week recovery, each participant completed the alternate condition. The fast condition consisted of 3 min warm-up, three MVIC trials, 3 sets of 10 eccentric reps at 70% of MVIC, and 3 MVIC trials. MVIC was measured as the difference between the pre-post MVIC trials and was analyzed using paired samples t-tests. **RESULTS:** The fast eccentric condition elicited significantly higher force average production across the 3 sets (740 ± 219 N vs. 569 ± 166 N, Cohen's $d=1.89$, $p=0.001$). The fast eccentric condition also caused a greater reduction in force from pre MVIC to post MVIC ($15 \pm 6\%$ vs. $10 \pm 6\%$, Cohen's $d=0.52$, $p=0.05$). **CONCLUSION:** These data show that fast eccentric resistance training requires greater force production and lower strength/power output when compared to pre-testing, this may contribute to greater muscle damage than standard slow eccentric training. More research should be conducted to determine whether long-term training leads to strength and size improvements.

