TACSM Abstract

No Differences in Strength Improvements Following Low- or High-Volume Resistance Training

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ABSTRACT

Resistance training is a widely used modality for improving muscular strength and reducing risks of injury, which is vital to counteracting physical declines associated with aging and poor health. Despite this, the minimal effective training dose for improving muscular strength has yet to be fully elucidated. **PURPOSE**: The purpose of this study was to examine the role of training volume (number of sets per session) on muscular strength changes following 8 weeks of progressive resistance training. **METHODS**: Fourteen and 12 trained males (Mean±SD; Age: 23±3y) and females (Age: 20±1y) participated in 8 weeks of supervised 3x/week progressive resistance training. Experimental sessions consisted of 3-5 repetition maximum testing both pre- and post-intervention, in accordance with the protocol outlined by the NSCA, in the following exercises: leg press (LP), bench press (BP), horizontal row (ROW), barbell Romanian deadlift (RDL), dumbbell overhead press (OHP), and lat pulldown (LAT). Following baseline strength testing, each participant was randomly allocated to either a low volume (LV; n=12 (5F)) or high volume (HV; n=14 (7F)) training group, completing 2 or 4 sets per exercise per training visit, respectively. Across all 8 weeks, participants completed each lift twice weekly, and loads were adjusted based on exercise performance using the autoregulated progressive resistance exercise protocol. Each group completed the same repetitions in their first sets, but completed the last set of every exercise until volitional failure. Percent change for each exercise was calculated as the difference between baseline strength (kgs) and post-training strength (kgs), expressed as a percentage of baseline strength. To examine the effect of group and exercise on the change in strength, a 2 (Group) × 6 (Exercise) analysis of covariance (ANCOVA) was performed, covarying for pre-test strength. In the event of a significant F test, the Bonferroni-corrected dependent-samples t-test was used. Values are presented as estimated marginal means ± standard error. **RESULTS**: There was no significant Group × Exercise interaction effect on percent strength change ($p=0.754$), nor a main effect of Group ($p=0.397$). However, there was a significant effect of Exercise ($p<0.001$). Post-hoc analyses indicated, when collapsing across training groups, improvements in strength were greater in LP when compared to BP (40.6±6.8%; $p<0.001$), RDL (26.9±6.1%; $p<0.001$), OHP (37.4±7.9%; $p<0.001$), and LAT (22.7±6.8%; $p=0.015$). Additionally, greater strength improvements were seen in ROW when compared to BP (29.7±4.5%, $p<0.001$), RDL (16.0±4.6%, $p<0.001$), and OHP (26.5±4.8%, $p<0.001$). Finally, LAT experienced greater strength increases than both BP (17.8±4.5%, $p<0.01$) and OHP (14.6±4.7%, $p=0.036$). There were no additional significant differences between exercises ($p=0.054$-0.999). **CONCLUSION**: Our findings suggest that a resistance training volume of as few as 2 sets per exercise twice weekly is adequate to induce muscular strength adaptations in previously trained young adults. Further examination is needed to determine if upper and lower body exercises require differing volumes to elicit similar adaptations.