BODY COMPOSITION CHANGES AFTER NINE WEEKS OF HIGH- OR LOW-LOAD RESISTANCE TRAINING

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ABSTRACT

BACKGROUND: Favorable alterations in body composition have been shown to positively impact athletic performance. Varying loading intensities of resistance training may influence the magnitude of body composition changes. The purpose of this study was to assess and determine changes in body composition and muscle thickness following nine weeks of high- or low-load whole-body resistance training. **METHODS:** Seventeen recreationally trained males (M_{age} = 20.4 ± 2.7 yrs) were recruited for this study. Participants were randomly assigned to one of two training groups: 30% (n=9) or 85% (n=8) of predicted 1-repetition maximum (1-RM). Participants completed three sessions per week of a whole-body workout (back squat, deadlift, bench press, T-row, bicep curls, skullcrushers) over nine weeks. Sessions consisted of three working sets to failure for each exercise at the prescribed percentage. Bioelectrical impedance analysis was used pre- and post-training program to assess body mass (BM), body fat percentage (%BF), and skeletal muscle mass (SMM). Ultrasound was used to assess muscle thickness at five locations: biceps, triceps, chest, quadriceps, and hamstrings. A paired T-Test was used to assess changes in each body composition measure from pre- to post-training. Significance was set a-priori at P<0.05. **RESULTS:** There were significant differences between groups with greater increases in the 85% group for SMM (2.6±1.6 vs 0.24±2.58 kg; P=0.041) and triceps thickness (0.44±0.34 vs 0.08±0.36 cm; P=0.035), with no significant group differences in any other measure. When collapsed across groups, there were additional significant changes in muscle thickness for biceps (P<0.001) and hamstrings (P=0.031). **CONCLUSION:** The difference in loading of resistance training in this study had a significant effect on SMM, with the 85% group showing greater increases. The training overall produced hypertrophy in a majority of the muscles measured, although it should be noted the 85% group demonstrated greater increases in muscle thickness overall with the only exception being the quadriceps. The results of this study indicate training at either lower or higher loads are both beneficial for increasing SMM and hypertrophy. Despite these findings, %BF was not significantly altered. Future research should incorporate other testing variables that may further favorably impact body composition and distinguish any additional loading differences.

The difference in loading of resistance training in this study had a significant effect on SMM, with the 85% group showing greater increases

Despite the changes in SMM, %BF was not significantly different

While there was overall hypertrophy in both groups, the 85% group demonstrated greater increases in muscle thickness in most muscles apart from the quadriceps

Whole body resistance training with low- or high-loads are both beneficial for increasing SMM and hypertrophy

Future research should incorporate other testing variables that may further favorably impact body composition and distinguish any additional loading differences

METHODS

- 17 recreationally-trained males training 2-4 days per week for at least 6 months were recruited for this study

Age (yrs)	Height (cm)	Weight (kg)	Years Training
20.4 ± 2.7	175.3 ± 7.9	77.9 ± 16.5	2.4 ± 1.2

- Participants were split into two training groups: high-load: 85% 1-RM (*n*=8) or low-load: 30% 1-RM (*n*=9)
- Lifters completed 3 sessions per week of a whole-body workout (squat, deadlift, bench, row, biceps, triceps) for 9 weeks, with three working sets to failure for each lift
- Bioelectrical impedance analysis was used to assess body mass (BM), body fat percentage (%BF), and skeletal muscle mass (SMM)
- Ultrasound was used to assess muscle thickness at five locations: biceps, triceps, chest, quadriceps, and hamstrings
- Participants were asked to not deviate from the baseline recall for the duration of the study, and were given 20g of whey isolate protein (TYM Performance) mixed with 16 oz water following each training session
- A paired T-Test assessed changes in body composition from pre- to post-training program with significance set a priori at P<0.05

BACKGROUND

With training, favorable alterations in body composition can occur, and subsequently have shown to positively impact athletic performance

The magnitude of changes in body composition may be influenced by different training strategies, particularly in resistance training with varying loads and intensities

The purpose of this study was to assess and determine changes in body composition and muscle thickness following nine weeks of high- or low-load whole-body resistance training

TYM ATHLETIC PERFORMANCE

RESULTS

- There were significant differences between groups with greater increases in the 85% group for SMM (2.6±1.6 vs 0.24±2.58 kg; P=0.041) and triceps thickness (0.44±0.34 vs 0.08±0.36 cm; P=0.035), with no significant group differences in any other measure
- When collapsed across groups, there were additional significant changes in muscle thickness for biceps (P<0.001) and hamstrings (P=0.031)