

Leg Lean Mass Adaptations Following Short-Term Barbell Training in Women

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ABSTRACT

Participation in a resistance training program results in both neural adaptations and increases in lean body mass, the latter of which is considered a slow process. The majority of previous investigations that have examined the time course associated with muscular adaptations have utilized exercise machines or single-joint movements. Furthermore, the adaptations associated with resistance training in women are not as well understood as those for men. The purpose of this investigation was to examine the effects of a four week resistance training intervention on changes in leg lean mass in untrained, college-aged women. Thirty-five women (mean \pm SD age = 21 \pm 3 years; body mass = 61.9 \pm 10.4 kg) with no previous lower-body strength training experience were randomly assigned to high volume training (n = 11), low volume training (n = 10), and control (n = 14) groups. The training groups performed the barbell back squat and deadlift twice per week for four weeks. The low volume training group performed five repetitions of two sets per exercise; the high volume group performed an additional two sets per exercise. The external loads were increased progressively during each training session. The mean \pm SD external loads used in this study increased from 27.9 \pm 8.2 to 51.4 \pm 14.0 kg for the barbell back squat and from 34.2 \pm 7.7 to 60.2 \pm 10.1 kg for the deadlift. Body composition analyses were performed during pre- and post-testing with dual X-ray absorptiometry. Manufacturer provided software was used to determine the appropriate region of interest in the assessment of leg lean mass. An analysis of covariance was used to compare the post-test data, and the pre-test data were used as the covariate. The results indicated that there was a statistically significant difference among the adjusted post-test means. Specifically, when the pre-test scores served as the covariate, the mean leg lean mass for the high volume training group was 0.503 kg greater than that for the control group ($p = 0.031$, 95% CI for adjusted mean difference = 0.038 to 0.968 kg). The pre-test – post-test effect sizes for the high volume training and low volume training groups were 0.31 and 0.29, respectively. Collectively, these findings demonstrated that a four week, high-volume training program involving barbell back squats and deadlifts produced small increases in leg lean mass in previously untrained women.