

THE EFFECTS OF ECCENTRIC AND CONCENTRIC RESISTANCE EXERCISE ON METABOLIC HEALTH.

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ABSTRACT

The purpose of this study was to 1) compare the effects of single sessions of eccentric (ECC) and concentric (CON) contractions, and 2) determine the effects of 12 wks of ECC and CON resistance training (RT) on parameters of metabolic health. Thirty sedentary and obese individuals were randomly assigned to complete a single session of either CON (n=15) or ECC (n=15) resistance exercise consisting of 3 sets of 10 repetitions of bilateral leg extension and leg curl at 75% of CON or ECC one repetition maximum ($1RM_{CON}/1RM_{ECC}$). Outcome measures were assessed at baseline (0 h) and 1, 24, 48, and 72 h post-exercise. Twenty-five of the 30 subjects also completed 12 wks of CON (n=13) or ECC (n=12) RT. Training consisted of whole-body RT 3-4 d/wk at 60-75% of $1RM_{CON}$ or $1RM_{ECC}$. Outcome measures were assessed pre- and post-training. The single session of ECC exercise produced significantly greater muscle degradation than CON exercise. The single session of exercise significantly reduced plasma TG and lipoproteins; however, there were no differences in these reductions between groups. No significant differences were found for plasma cytokines, glucose, or insulin. RT resulted in significant reductions in body fat%, waist circumference, diastolic blood pressure, and mid-thigh adipose tissue (AT) and significant increases in muscular strength, lean body mass, and mid-thigh total- and high density-muscle with no significant group differences. There were no significant changes in abdominal AT, plasma TG, lipoproteins, cytokines, glucose, or insulin following RT. Although a single session of ECC contractions resulted in greater skeletal muscle degradation than CON, the effects on plasma metabolic variables were similar in the two groups. Both CON and ECC RT produce beneficial alterations in metabolic health.