

The Effects of Short-Term Detraining and Subsequent Retraining on Body Composition and Muscle Performance in Males Consuming a Whey Protein or Carbohydrate Supplement

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ABSTRACT

An acute bout of resistance exercise (RE) can up-regulate processes that stimulate muscle protein synthesis (MPS). Additionally, nutritional strategies involving carbohydrate (CHO) and whey protein (WP) supplementation can augment MPS. However, resistance training (RT) induced muscle anabolism during the early phases of training can attenuate over time. The use of a short-term cessation of training (detraining; DT) can potentially restore the attenuated muscular anabolic adaptive responses. Therefore, the purpose of this study was to explore the effects of a successive cycle of detraining and retraining (ReT) in humans on body composition and muscle performance. Resistance-trained males (age 20.95 ± 1.23 y; $n=20$) were recruited and randomized into one of two groups (WP or CHO; 25 grams) in a double-blind fashion. Both groups followed a standardized 4 days per week resistance-training program for 4 weeks, carried out 2 weeks of DT and continued the resistance-training program for another 4 weeks of ReT. Participants were instructed to consume their respective supplement only on workout days during RT, but every day during DT. Research visits were conducted at baseline, 4 weeks (post-RT), 6 weeks (post-2-week-DT), and after 10 weeks (post-ReT). Each visit consisted of body composition assessments and muscular strength and endurance testing using the bench press and angled leg press exercises. Four-day diet records, workout logs, and supplement compliance forms were utilized. Factorial 2x4 (group by time) ANOVAs with repeated measures were conducted using SPSS (version 20.0) with a probability level of $\leq .05$. There were no significant group by time interactions for lean or fat mass changes throughout the study ($p > .05$). However, both groups were able to retain lean mass following 2 weeks of DT. The WP group appeared to have an elevation in lean mass (+1.58kg on average) by the end of ReT in comparison to baseline, even though it was not statistically significant ($p > .05$). Leg press strength (LPS) increased throughout the study ($p=.003$), and neither group showed a decrease in LPS following DT. There were no group-by-time interactions or group differences between WP and CHO for bench press strength (BPS), bench press endurance (BPE), leg press endurance (LPE), or any dietary variables ($p > .05$). Interestingly, the WP group presented a non-significant overall increase in lean mass compared to the CHO group by the end of 10 weeks. LPS and BPS were also elevated and retained respectfully following DT. In summary, a short-term 2 week cycle of DT in resistance trained males maintained both muscle mass and muscular strength, which potentially reinforces the importance of recovery.