

Physiological Predictors of Performance Adaptations in a 2-week Exercise Microcycle

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Abstract

INTRODUCTION: Physical inactivity (PA) poses a threat to public health as it is associated with chronic diseases and all-cause mortality. Although public health organizations have encouraged the engagement of PA, there is a heterogeneity that exists in exercise training-induced adaptations following a standardized exercise program and understanding these factors may provide valuable insight into individualizing training prescription. The purpose of this study was to test the ability of individual baseline physiological characteristics to predict cardiovascular and strength responses following 2-weeks of standardized resistance or aerobic training. It was hypothesized that individuals with predominantly type 1 myofibers will have a greater increase in maximal oxygen consumption following aerobic training, while those with predominantly type 2 fiber will have a greater increase in isokinetic force to resistance training.

METHODS: This study was an 8-week crossover randomized trial intervention. Participants (n=5) underwent baseline, mid, and post testing measurements which included, VO₂peak, isokinetic strength, and muscle fiber composition estimation, before and after a block of training sessions. Participants were randomly assigned into the aerobic or resistance training group and completed 7 training sessions for each intervention.

RESULTS: There was a strong linear association between Δ VO₂peak after aerobic and after resistance training, ($r = 0.69$, $p = 0.16$). A moderate association between baseline VO₂peak and Δ VO₂peak was observed for both aerobic and resistance training (endurance $r = -0.514$, resistance $r = -0.557$). The adaptation of VO₂Peak in comparison to peak torque wasn't significant.

DISCUSSION: Although the findings of this study weren't significant, there were various limitations that may have contributed to the results such as free-living population, VO₂Peak rather than VO₂Max test, and lack of participants.