

Effects of combined training or moderate intensity continuous training during a 3-week multidisciplinary body weight reduction program on cardiorespiratory fitness, body composition, and substrate oxidation rate in adolescents with obesity.

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Scientific Reports 13: 17609, 2023.

This study aimed to investigate the effects of combined training (COMB, a combination of moderate intensity continuous training-MICT and high-intensity interval training-HIIT) vs. continuous MICT administered during a 3-week in-hospital body weight reduction program (BWRP) on body composition, physical capacities, and substrate oxidation in adolescents with obesity. The 3-week in-hospital BWRP entailed moderate energy restriction, nutritional education, psychological counseling, and two different protocols of physical exercise. Twenty-one male adolescents with obesity (mean age: 16.1 ± 1.5 years; mean body mass index [BMI] 37.8 ± 4.5 kg m⁻²) participated in this randomized control trial study (n:10 for COMB, n:11 MICT), attending ~ 30 training sessions.

The COMB group performed 3 repetitions of 2 min at 95% of peak oxygen uptake ($\dot{V}O_2$ peak) (e.g., HIIT $\leq 20\%$), followed by 30 min at 60% of $\dot{V}O_2$ peak (e.g., MICT $\geq 80\%$). Body composition, $\dot{V}O_2$ peak, basal metabolic rate (BMR), energy expenditure, and substrate oxidation rate were measured during the first week (W0) and at the end of three weeks of training (W3). The two training programs were equivalent in caloric expenditure. At W3, body mass (BM) and fat mass (FM) decreased significantly in both groups, although the decrease in BM was significantly greater in the MICT group than in the COMB group (BM: -5.0 ± 1.2 vs. -8.4 ± 1.5 , $P < 0.05$; FM: -4.3 ± 3.0 vs. -4.2 ± 1.9 kg, $P < 0.05$). $\dot{V}O_2$ peak increased only in the COMB by a mean of 0.28 ± 0.22 L min⁻¹ ($P < 0.05$). The maximal fat oxidation rate (MFO) increased only in the COMB group by 0.04 ± 0.03 g min⁻¹ ($P < 0.05$). COMB training represents available alternative to MICT for improving anthropometric characteristics, physical capacities, and MFO in adolescents with obesity during a 3-week in-hospital BWRP.

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