Effects of low- and high-intensity exercise training on body composition and substrate metabolism in obese adolescents.

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The objective was to investigate the effects of a 3-week weight-management program including moderate energy restriction and exercise training at 2 intensities [low intensity (LI): 40% and high intensity (HI): 70% maximal oxygen uptake ($V'O_2max$)] on body composition, energy expenditure, and fat oxidation rate in severely obese adolescents. Twenty obese adolescents, aged 15-17 yr (body mass index: 37.5 kg/m^2; 38.2 % fat mass) participated in this study. Befpre starting (week 0, W0) and at the end of the weight-management period (week 3, W3), body composition was assessed by a multifrequency tetrapolar impedancemeter; basal metabolic rate (BMR), energy expenditure, and substrate oxidation rate during exercise and post-exercise recovery by indirect calorimetry. At W3, body mass and fat mass decreased significantly ($p<0.005$) in all groups, and the decreases were significantly greater in the LI than in the HI group (-8.1±1.6 *vs* -5.9±1.6 kg and -4.2±1.9 *vs* -2.3±1.7 kg, $p<0.05$, respectively). Predicted $V'O_2max$, expressed in relative values, changed significantly only in the HI group by +0.010±0.006 l/(kg fat-free mass x min) ($p=0.010$). by contrast, no significant changes were observed at W3 in BMR, energy expenditure, and substrate oxidation rate during exercise and post-exercise recovery. In conclusion, LI (49% of $V'O_2max$) physical activity favors fat oxidation and it seems advisable to encourage obese adolescents to perform LI physical activity which is more feasible and acceptable than intense exercise.