Abstract:

The Effects of Exercise Training on Resting Metabolic Rate in Youth with Overweight or Obesity

Background: Resting metabolic rate (RMR) has been identified as an important factor for weight management. Resistance training has been proposed to increase muscle and RMR in adults. However, little is known on the effects of different exercise modalities on RMR in youth who generally have less muscle mass than adults. Thus, this study will examine 1) the effects of aerobic and/or resistance exercise weight loss without caloric restrictions on RMR and 2) whether changes in body composition are associated with changes in RMR in youth with overweight or obesity.

Methods: 140 post-pubertal boys and girls (≤18 years, BMI percentile > 85%) were randomly assigned to either a control group (n=18) or one of 3 exercise modalities: aerobic (n=51), resistance (n=50) or a combination of aerobic and resistance (n=21). RMR was measured by indirect calorimetry with a ventilated hood and body composition was measured by DXA and MRI.

Results: Changes in absolute RMR did not differ between different exercise modalities versus control (p>0.05). Significant decreases in fat mass (FM) were observed only in the aerobic (-1.8 ± 0.4 kg) and resistance groups (-1.0 ± 0.4 kg) whereas all groups decreased in visceral fat (-0.2 ± 0.02 kg) compared to control. Increases in fat free mass (FFM) was only seen in the combined group (2.3 ± 0.4 kg) whereas increases in skeletal muscle were observed in both resistance (1.2 ± 0.2 kg) and combined (1.5 ± 0.3 kg) groups versus control. Changes in FFM, but not FM, visceral fat or skeletal muscle was a significant determinant of RMR change independent of exercise modality (p=0.04).

Conclusion: Although the type of exercise performed did not have an effect on RMR change, findings from the study support that changes in FFM is an important predictor of RMR change in youth with overweight or obesity.