MAXIMAL FAT OXIDATION IS HIGHER IN POST-OBESE AND OBESE THAN IN WEIGHT-MATCHED CONTROLS

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Introduction

Maintenance of weight loss in previously obese subjects is difficult and it has been suggested this may be due to a reduced whole body fat oxidation capacity. The present study aimed to examine whether maximal fat oxidation is different between formerly obese (PO), current obese (O) and weight-matched control (C) subjects.

Methods

Healthy young normoglycemic males were recruited into three groups. The PO (n=7, weight loss 23 – 52 kg [range], BMI<30 kg/m2 and weight stable for at least two months), the O (n=5, BMI>30 kg/m2) and a C group (n=5, BMI<30 kg/m2). The C and PO group was matched by BMI. Initially subjects came overnight fasted and performed an oral glucose tolerance test (OGTT) and an incremental maximal oxygen uptake (VO2max) test. Body composition was determined by DEXA. On a separate day, subjects came overnight fasted again and maximal whole body fat oxidation was determined using a graded bicycle exercise test commencing at 60 Watt for 8 min followed by 35 Watt increments every 3 min (1).

Results

The BMI was significantly lower in PO and C compared to O (27.3 ± 0.8 [mean ± SE] and 26.8 ± 0.9 vs. 33.8 ± 1.9 kg/m2, respectively, both p<0.05). PO, C and O had similar lean body mass (67.2 ± 1.8, 65.2 ± 2.1 and 67.2 ± 6.2 kg, respectively). VO2max (39.8 ± 5.9 and 40.5 ± 7.5 vs. 27.7 ± 4.4 mL·min⁻¹·kg⁻¹) was also significantly higher in PO and C than in O. Maximal whole body fat oxidation (388 ± 19 and 363 ± 27 vs. 248 ± 32 mg min⁻¹) calculated by indirect calorimetry was higher (p<0.05) in PO and O compared to C. Maximal fat oxidation occurred at a higher (p<0.05) relative workload in O than in C. VO2 max, respectively), while this difference did not reach statistical significance for PO (45.8 ± 3.3 %, p=0.09 vs. C).

Discussion

A novel observation of this study was that maximal fat oxidation in O and PO (p=0.09) males occurred at a higher relative workload than in C. Moreover, we observed a higher maximal fat oxidation in PO and O than in C. In the present study maximal fat oxidation in the C group, which was overweight, was identical to maximal fat oxidation in previously examined normal weight subjects (4). Maximal fat oxidation has not previously been studied in PO, but two prior studies in post-obese female subjects and controls, with normal BMI, found similar fat oxidation during exercise at a similar relative workload (2, 3). This indicates that our observation of higher maximal fat oxidation in PO than C, both groups overweight, may be influenced both by BMI and gender.

Conclusion

Surprisingly post-obese and obese male subjects have higher maximal fat oxidation occurring at a higher relative workload than weight-matched control subjects.

References


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