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### Assessment of Metabolic Flexibility to a Glucose Tolerance Test in Young Adults

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**PURPOSE:** To compare postprandial metabolic response to an oral glucose tolerance test in young adults of varying body mass index (BMI) classifications. **METHODS:** Young adults (ages 18-40; n = 20, 10 females) completed a cardiopulmonary exercise test on a cycle ergometer to determine maximal aerobic capacity ( $VO_{2MAX}$ ). Indirect calorimetry was conducted prior-to (fasting) and following (30, 60, 90, 120 min) consumption of a 100g glucose beverage. Metabolic flexibility was defined as the change in respiratory exchange ratio (RER) from baseline to 60 minutes. Serum and plasma were collected at corresponding timepoints and analyzed for blood glucose, insulin, and non-esterified fatty acids. Student's t-test was used to determine significance among indices of metabolic flexibility and anthropometric measures between those with a healthy BMI (<24.9; n = 11) vs. those with overweight or obesity (BMI  $\geq$  25.0; n=9). An  $\alpha = 0.05$  was determined a priori. Hedge's g was used as a measure of effect size. **RESULTS:** Compared to those with a healthy BMI, those with overweight or obesity had a higher BMI ( $23.0 \pm 1.6$  vs.  $30.7 \pm 4.1$ ;  $p < 0.001$ ,  $g = 2.3$ ), lower relative  $VO_{2MAX}$  ( $41.3 \pm 7.7$  vs.  $28.7 \pm 7.4$  mL/kg/min;  $p = 0.002$ ,  $g = 1.6$ ), higher visceral adipose tissue mass ( $0.42 \pm 0.52$  vs.  $1.58 \pm 0.98$  lbs.;  $p = 0.008$ ,  $g = 1.4$ ), higher overall fat mass ( $36.1 \pm 9.6$  vs.  $67.8 \pm 17.4$  lbs.;  $p < 0.001$ ;  $g = 2.1$ ), and similar overall lean mass ( $105.1 \pm 17.0$  vs.  $123.5 \pm 21.9$  lbs.;  $p = 0.055$ ,  $g = 0.9$ ). The following RER values were recorded across all participants:  $0.79 \pm 0.06$  at fasting,  $0.80 \pm 0.07$  at 30 min,  $0.83 \pm 0.06$  at 60 min,  $0.84 \pm 0.06$  at 90 min, and  $0.85 \pm 0.06$  at 120 min. Metabolic flexibility was higher in those with a healthy BMI than those with overweight or obesity ( $0.058 \pm 0.05$  vs.  $0.036 \pm 0.04$ ), though these differences were not significant in this sample ( $p = 0.31$ ,  $g = 0.44$ ). **CONCLUSION:** Despite differences in cardiorespiratory fitness and anthropometric variables, we show metabolic flexibility is reduced but not significantly impaired in young adults with overweight or obesity when compared to young adults with a healthy BMI. **SIGNIFICANCE/NOVELTY:** Overweight and obesity in young adulthood significantly increases the lifetime risk for chronic disease. In studies focused on older adults, blunted metabolic flexibility has been linked to insulin resistance, metabolic syndrome, and fat mass deposition. Impaired changes in postprandial glucose metabolism in young adults with overweight and obesity warrants further study to determine whether these relationships hold in this population.