

## Does Having a Glucose Peak Time within 30 Minutes of Glucose Ingestion Indicate Better Metabolic Flexibility?

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### ABSTRACT

Metabolic flexibility is the ability of the body to physiologically adapt to fuel oxidation in response to fuel availability assessed by change in respiratory quotient (DRQ) from fasted to glucose/insulin-stimulated states. Glucose peak time describes the time of the highest plasma glucose concentration during an oral glucose tolerance test (OGTT). Peak time >30 minutes has been associated with increased odds of prediabetes compared to peak times ≤30 minutes. **PURPOSE:** The purpose of the study was to determine if glucose peak time within 30 minutes of glucose ingestion during an OGTT is indicative of better substrate utilization. **METHODS:** Sixty-two healthy participants without diabetes (34 males, 28 females) participated in this study (Age  $26.02 \pm 8.25$  years; BMI  $28.91 \pm 4.71$  kg/m<sup>2</sup>). Blood glucose levels were measured during an OGTT at 0, 30, 60, 90, 120, 150, and 180 minutes. Participants were classified in two groups based on whether glucose level reached its peak at 30 min (≤30) or after 30 min (>30) during the OGTT. Substrate utilization was assessed by measuring respiratory quotient (RQ) using indirect calorimetry. Metabolic flexibility was calculated from the change in RQ (DRQ) from fasted to postprandial condition. Groups were compared using unpaired t-test. **RESULTS:** Fasting blood glucose was not significantly different between participants with peak time ≤30 minutes and peak time >30 ( $96.15 \pm 11.50$  vs.  $98.20 \pm 11.14$  mg/dL;  $p=0.49$ ). Fasting RQ was also not significantly different between two groups ( $0.78 \pm 0.07$  vs.  $0.77 \pm 0.08$ ;  $p=0.84$ ). However, post-prandial RQ for participants with glucose peak time ≤30 minutes was significantly higher compared with those with peak time >30 minutes ( $0.83 \pm 0.07$  vs.  $0.77 \pm 0.04$ ;  $p=0.002$  respectively). The change in RQ (DRQ) tended to be higher for participants with peak time ≤30 minutes compared with those with peak time >30 minutes ( $0.06 \pm 0.05$  vs.  $0.03 \pm 0.05$ ;  $p=0.06$  respectively). **CONCLUSION:** Glucose peak time of ≤30 minutes does indicate greater glucose utilization compared with peak time >30 minutes evident by post-prandial RQ, however since DRQ was not statistically different, based on our data we are unable to conclude that peak time ≤30 minutes is indicative of better metabolic flexibility compared with >30 minutes. Further research in this area is needed.