

Comparison of responses to oral glucose challenge by physical activity duration and intensity

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The glycaemic response to an oral glucose tolerance test (OGTT) can be used to predict risk of development of type 2 diabetes mellitus⁽¹⁾. Low habitual physical activity is associated with undiagnosed impaired glucose tolerance and type 2 diabetes⁽²⁾, and OGTT response is inversely related to physical activity levels in a population at risk of T2D development. However the relationship between habitual physical activity and OGTT response in a low-risk population is not as well understood. The study was approved by the Ethics Committee of Sheffield Hallam University and all participants provided written informed consent. Thirty-one non-diabetic adults (25.9yrs ±6.6; 23.8 kg/m² ±3.8) participated. An OGTT was performed: capillary blood samples were obtained and analysed for blood glucose at baseline, 15, 30, 45, 60, 90 and 120 minutes after ingestion of 50 g of glucose. Participants were categorised into 3 groups based on self-reported physical activity levels: Sedentary (< 30 min.day⁻¹ 'moderate' intensity activity, n = 11), Active (≥ 30 min.day⁻¹ of 'moderate' intensity physical activity, n = 10) and Very Active (≥ 60 min.day⁻¹ of 'intense' physical activity (n = 10). There were no significant differences between groups for age or percentage body fat (P > 0.05); however, there was a significant difference between groups for BMI (P = 0.043). Area under the curve (AUC) was significantly impacted by the intensity and duration of physical activity (P = 0.049) with the AUC of the very active group being significantly lower than that of the sedentary and active groups (P = 0.027 and P = 0.041 respectively). There was no significant difference between the active and sedentary groups (P = 0.844).

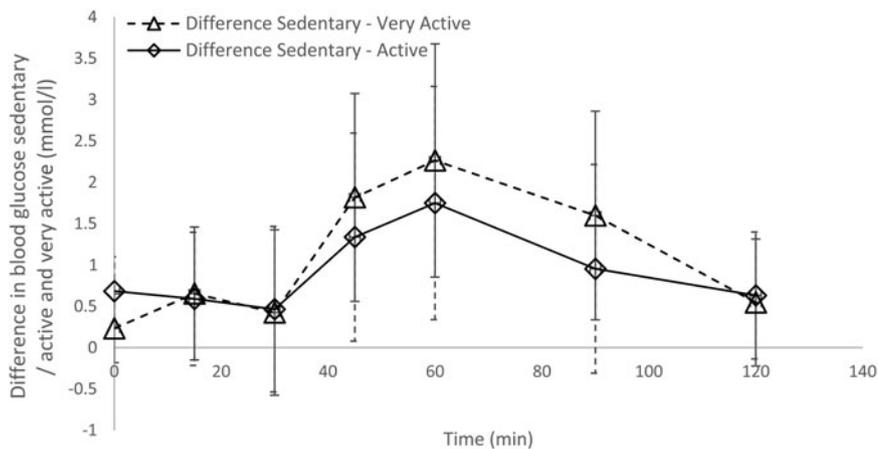


Fig 1 Difference in blood glucose levels between sedentary / active (diamond shape) and very active (triangle shape) participants. Error bars represent 95 % CI.

Differences in blood glucose response in non-diabetic subjects doing different amounts and intensities of physical activity needs further exploration; this preliminary investigation begins to identify where the differences may lie.

1. Alys A, Almgren P, Akerlund M *et al.* Modelling of OGTT curve identifies 1 h plasma glucose level as strong predictor of incident type 2 diabetes: results from two prospective studies *Diabetologia* 58:87–97
2. Dunstan DW, Salmon J, Owen N *et al.* (2004) Physical Activity and Television Viewing in Relation to Risk of Undiagnosed Abnormal Glucose Metabolism in Adults *Diabetes Care* 27, 11, 2603–2609