The Dynamic Insulin Sensitivity and Secretion Test (DISST): a novel test to measure both insulin sensitivity and β-cell function
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Introduction
Insulin action and β-cell function are key components of the development of impaired glucose tolerance, type 2 diabetes and insulin resistance. Both the potential to explore and pharmacology of diabetes prevention and treatment are thus dependent on a reliable and accessible measure of insulin sensitivity and secretion. We propose a novel test (the DISST) which provides a quantitative measure of insulin sensitivity (SI) and secretion by calculating the ratio of insulin sensitivity to secretion. We validated the DISST in individuals with impaired glucose tolerance and showed that the DISST has good inter-rater reliability and excellent test-retest reliability in the general population. Our new test is a dynamic physiological method involving a small intravenous dose of glucose (15g) and insulin (0.05 U/kg) to be infused over 2 minutes. Both insulin and C peptide concentrations were measured every 10 minutes, from 0 to 120 minutes, after the glucose bolus was injected. The DISST shows a better calibration in those with lower insulin sensitivities when compared with the standard clamp test. This is a clinical comparison, and we can only be used for subjects that are able to tolerate the glucose clamp test.

Results

Figure 2. DISST protocol

Figure 3. Composite of DISST measurements, showing the dynamic changes in plasma glucose and insulin C-peptide during the DISST protocol. The DISST shows a better calibration in those with lower insulin sensitivities.