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BLOOD GLUCOSE SENSING THROUGH SKIN BY NON-INVASIVE FINGER TOUCH METER

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Self-monitoring of blood glucose (SMBG) by patients with type-1 diabetes as well as high risk type-2 diabetes is important to maintain blood glucose level in the normal glycaemic region (4-7mmol/dl). Recent progress in glucose monitoring is focussed on developing point-of-care diagnostics which are either minimally invasive or non-invasive in nature. We have developed a state-of-the-art non-invasive finger touch meter (GlucoSense) which senses capillary blood glucose using a novel photonic glass sensor. The measurement of blood glucose using the novel photonic glass developed during this work offers high signal to noise ratio thus yielding a better result. When excited with a pulsed laser diode it emits signature fluorescence in the near infrared region (NIR) at a wavelength which is glucose absorbs more strongly than other molecules present in blood such as lactates and urea. Glucose in the blood modifies the fluorescence decay lifetime of photonic glass, the extent of which depends on its concentration. The “proof of concept” pilot clinical study was carried out with 12 candidates with type-1 diabetes, attending two sessions of 8 hours duration. The measurement method involved contacting a fingertip with the photonic glass, and the results were compared to corresponding blood glucose values obtained using a traditional SMBG meter as well as a continuous glucose monitor (CGM) using Clarke Error Grid (CEG) analysis. CEG comparison of the GlucoSense results with those obtained using SMBG and CGM shows clinical acceptability of 96.5% and 92.3%, respectively. The next stage of development to demonstrate a portable and more stable GlucoSense platform is currently ongoing.