

Application of a Multisensor Device for Non Invasive Continuous Glucose Monitoring under Home-Use Conditions

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We reported earlier about the findings in experimental studies of the application of a novel Multisensor device under development for continuous non invasive glucose monitoring (NIGM). Under controlled conditions the Multisensor yielded a R2 of 0.68 and a Mean Absolute Relative Difference (MARD) of 27.3% compared to capillary self monitoring of blood glucose reference blood glucose (SMBG) values. Here we report about the application of a first portable version of the Multisensor under development under home use conditions.

16 T1DM patients (age 39 ± 12 y; BMI 23.8 ± 2.7 kg/m², duration of diabetes 20 ± 13 y; HbA1c $6.8 \pm 0.8\%$) wore the Multisensor. Each patient performed a maximum total of 24 study days over a period of 4 months.

Patients collected on average 11 SMBG measurements during each study day. The study was split into two blocks, of overall 160 non consecutive and 220 preferably consecutive days, respectively. Measurements from the first block were used to train a linear regression model. The model was then prospectively applied on the second block of data.

The model yielded a MARD of 39.7%, and a Mean Absolute Difference (MAD) of 44.8 mg/dL when comparing the Multisensor to the SMBG values. The data were collected during daily life and across climatic conditions, ranging from hot summer to colder autumn.

Application of the Multisensor under daily life conditions using a purely statistical model, prospectively applied demonstrates that glucose variations can be tracked per se. The findings from this study will help to further develop the Multisensor concept towards.