MODULAR DIABETES MANAGEMENT SYSTEMS

BACKGROUND

[0001] As the number of patients suffering from diabetes and similar medical conditions increases, self-monitoring of blood glucose wherein the patient monitors his or her blood glucose levels has become a common practice. The purpose of monitoring the blood glucose level is to determine the concentration level and then to take corrective action, based upon whether the level is too high or too low, to bring the level back within a normal range. The failure to take corrective action can have serious medical implications. Glucose monitoring is a fact of everyday life for diabetic individuals. Failure to test blood glucose levels properly and on a regular basis can result in serious diabetes-related complications, including cardiovascular disease, kidney disease, nerve damage and blindness.

[0002] People with diabetes who intensively manage their blood sugar experience long-lasting benefits. The Diabetes Control and Complications Trial (DCCT) was a clinical study conducted from 1983 to 1993 by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The DCCT compared intensive to conventional treatments. Patients on intensive treatment kept glucose levels as close to normal as possible with at least three insulin injections a day or an insulin pump, and frequent self-monitoring of blood glucose. Intensive treatment aimed to keep hemoglobin A1c (HbA1c), which reflects average blood glucose over a 2- to 3-month period, as close to normal as possible. Intensive treatment aimed to keep hemoglobin A1c (HbA1c), which reflects average blood glucose over a 2- to 3-month period, as close to normal as possible. Conventional treatment consisted of one or two insulin injections a day with once-a-day urine or blood glucose testing. The results of the DCCT study showed that keeping blood glucose levels as close to normal as possible slows the onset and progression of eye, kidney, and nerve diseases caused by diabetes. In fact, it demonstrated that any sustained lowering of blood glucose helps, even if the person has a history of poor control.

[0003] A number of glucose meters are currently available that permit an individual to test the glucose level in a small sample of blood. Many of the meter designs currently available make use of a disposable test element which in combination with the meter measures the amount of glucose in the blood sample electrochemically or optically. In current glucose meters, the information displayed as a consequence of a successful blood glucose measurement is the respective blood glucose value, typically shown in mg/dL or mmol units, and perhaps the time and date the measurement was performed. This information in combination with calculation of planned or known intake of carbohydrates or planned or known activities and knowledge of other situational or individual factors is in most cases sufficient to allow diabetics to adjust or derive their dietary intake and/or an immediate dose of insulin to inject to control blood glucose level on the short-term. Also, in case of low glucose values, diabetics can detect the need for intake of sugar to avoid hypoglycemia. Further, analysis of multiple blood glucose measurements taken over a period of time assists diabetes patients in determining what, if any, long term changes are necessary for their diabetes management routine. Given the ramifications of accurate recording, reporting and analyzing of blood glucose measurements, improvements in the apparatus and/or procedures to meter blood glucose are desired.

SUMMARY

[0004] A system includes a stand-alone blood glucose meter that is positionable within an internal receptacle of a portable, handheld docking device. The docking device is configured to interface with the blood glucose meter to facilitate user configuration of the blood glucose meter and analysis of blood glucose measurement data stored on the blood glucose meter. Among other things, the interface between the docking device and the blood glucose meter reduces the time and complexity currently associated with blood glucose management.

[0005] In one aspect, a system includes a portable, stand-alone blood glucose meter including a display and a first connection element. The system also includes a portable, handheld docking device including a display operable to provide information related to functions performed by said blood glucose meter and a housing defining an external profile of the docking device and an internal receptacle. The internal receptacle includes a second connection element engageable with the first connection element. The blood glucose meter is positionable in the internal receptacle and a communication interface is defined between the blood glucose meter and the docking device when the blood glucose meter is positioned in the internal receptacle and the first connection element is engaged with the second connection element.

[0006] In one refinement of the aspect the blood glucose meter includes a meter housing which substantially corresponds in size and shape to the internal receptacle. When the blood glucose meter is positioned in the internal receptacle the meter housing is substantially surrounded by the internal receptacle and located within the external profile of the docking device.

[0007] In another refinement of the aspect the housing of the docking device includes a sidewall extending between a first surface and a second surface positioned opposite of the first surface and the internal receptacle is positioned between the first and second surfaces.

[0008] In another refinement of the aspect the internal receptacle includes a receiving portion extending through the sidewall of the housing.

[0009] In another refinement of the aspect the second surface includes an opening in communication with a portion of the internal receptacle adjacent to the receiving portion.

[0010] In another refinement of the aspect the second connection element is positioned in the internal receptacle opposite of the receiving portion.

[0011] In another refinement of the aspect one of the first connection element and the second connection element defines a plug and the other of the first connection element and the second connection element defines a port structured to receive the plug.

[0012] In another refinement of the aspect the blood glucose meter includes a meter housing defining a test element port for receiving a test element. An appropriate test element may comprise the form of a test strip configured for either electrochemical or optical techniques of detection of blood glucose concentration.

[0013] In another refinement of the aspect the first connection element is positioned on the meter housing opposite of the test element port.