Advanced Technology Improves Lives Of People Living With Diabetes

RESEARCH AND INNOVATIONS There are many professional athletes living with type 1 diabetes, and they excel in their respective sports by carefully managing their health — and that is becoming easier with each passing year.

Video: Fred Cunha

In a person who has type 1 diabetes, the pancreas doesn't produce enough insulin, a hormone that lowers blood sugar levels, and this can potentially lead to cardiovascular disease, kidney failure, blindness and other complications. Type 1 diabetes can be a life-threatening disease, and approximately 300,000 Canadians have it, while more than 2.5 million people are living with type 2 diabetes.

For decades, people with diabetes have been taking insulin injections and adjusting their diet and exercise to keep their blood sugar levels normal. They have been monitoring those levels by using blood glucose meters, which require the patient to prick their finger with a lancing device to get a blood sample, and then use a meter to measure the sugar level in the blood.

Better management comes from advanced pumps

But times have changed significantly in the past several years. The last decade has seen the growing popularity of two additional devices that allow people living with diabetes to accurately manage their glucose levels and treat their disease.

The first of these devices is continuous glucose-monitoring (CGM), which measures glucose levels in real-time throughout the day and night. A small sensor is inserted under the skin and it measures glucose levels in the tissue fluid. The sensor sends the information, through wireless radio frequency, to an insulin pump. The patient is notified when their blood sugar is getting too high or too low.

The second device is the insulin pump, which provides the patient with insulin around the clock through a small, flexible tube (catheter) placed under the skin, typically in the abdomen. The patient controls the pump when it comes to how much insulin to deliver through a few simple button pushes.

The latest generation of pumps are integrated with and communicate with the CGM to display glucose levels and alarm you if your glucose levels are going too high or low. One pump automatically suspends insulin delivery for up to two hours when glucose levels drop too low. This new pump can accommodate the patient's unique requirements and give them more freedom to set their own routine — eating, sleeping and exercising at times that suit them.

Insulin pump technology is cutting edge, allowing diabetics to reach new milestones.

Progression in technology

Bruce Perkins, an endocrinologist at Mount Sinai Hospital in Toronto, is enthusiastic about the pump and sees it as a big step in the technological progression toward an automated system that monitors the patient's glucose levels and delivers the right amount of insulin and glucagon (a hormone that raises blood sugar levels) with no input from the patient. "The ultimate goal is for [a device] to function like a pancreas," he says. Perkins would like these pumps to be more readily available to people with diabetes. He says we should be "encouraging government and insurance companies to provide the coverage."

Exercise is key

Michael Riddell, Professor and Graduate Program Director of the School of Kinesiology and Health Science at York University, emphasizes the importance of diet and exercise in managing diabetes. "When you exercise, you train your muscles and they become more sensitive to insulin so you can control blood sugar without as much help", he says.

Riddell, author of the soon-to-be-released book Getting Pumped! A Guide to Insulin Pump Therapy for Active Individuals With Type 1 Diabetes, adds that the pumps are a benefit to athletes, and he even predicts a day when these devices will have sensors sophisticated enough to be tailored for use in specific sports. "There have been great improvements in managing diabetes in recent years", he says, and "more dramatic change is just around the corner."

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