

Wearable Devices: Revolutionary Tools for Parkinson's Research

Parkinson's disease (PD) progression varies widely from patient to patient. To date, it has been nearly impossible for researchers to capture a truly accurate picture of the diverse day-to-day experiences of people living with PD, which in turn, slows progress toward a cure. But, today, a new field of technology called "wearable devices" has the potential to revolutionize how we collect this critical information from patients.

In the simplest terms, wearable devices are electronics that can be worn on the body to collect a constant stream of data. A pedometer, for example, is a basic and well-known wearable device that collects the number of footsteps, distance and speed of the person wearing it. Today's wearable devices include an accelerometer that detects and measures motion, and sometimes a user interface that can share, report and display the data being collected. Some popular examples of today's newer wearable devices include the Nike Fuel Band, Google Glass, and even everyday smartphones.

Today, clinicians assess patients' motor symptoms in a five to ten minute in-person assessment during planned appointments. This brief snapshot of a patient's experience with PD only represents the one percent of their time spent in front of a doctor, and provides little insight into the other 99 percent of daily life with Parkinson's. Now, wearable devices offer the opportunity to capture immensely more information about a person's movements more consistently than standard in-person assessments – 300 data points per person per second, in fact. Having better data about the reality of Parkinson's motor symptoms, and comparing it with data from people who do not have PD, will help researchers better understand what patients experience on the whole and better focus their research to address patients' needs. In sum, wearable devices have the potential to revolutionize how we conduct PD research.

Wearable Devices: Why Now?

While data gathered from wearable devices cannot fully replace in-person motor assessments, it is expected to play a key role in disease assessment and treatment planning in the future. So, if these devices have so much potential, why are we just hearing about them now? Ultimately, there are three fundamental reasons:

1. **Size:** Today's wearable devices are tiny compared to those used historically, allowing patients to wear them with ease as they go about their daily lives and making data collection especially convenient.
2. **Data and Analytics:** The evolution of computer technology and the emergence of "Big Data" have made it possible to collect and analyze the enormous sets of data and information that wearable devices can collect.
3. **Cost and Accessibility:** Compared to the large, complex machines previously used to collect information about movements associated with Parkinson's disease, today's wearable devices are relatively inexpensive. Previously, these devices could be purchased only by medical facilities for use in research, but today, everyday consumers can purchase wearable devices directly.

Parkinson's Research and Wearable Devices: What's Next?

Over the past ten years, there have been many studies using wearable devices to collect measures of Parkinson's disease. Until recently, these devices have been large, cumbersome, and expensive. But today, wearable devices are more sophisticated than ever, and scientists can now use them to gather larger amounts of data than was previously possible. Furthermore, a new field called "machine learning" has also emerged to analyze the massive amounts of longitudinal data (collected repeatedly over a period of time) that can be gathered from wearable devices. Both the large amounts of data and new technologies for analyzing them may yield new insights for Parkinson's research.

Given these exciting developments, The Michael J. Fox Foundation for Parkinson's Research is piloting Fox Insight Wearables in order to use smartwatches and a mobile app to collect data about motor symptoms in PD. The goals of this pilot two-fold: 1) to collect data using smartwatches and smartphones to monitor and track PD symptoms in patients experiencing motor fluctuations, and 2) to develop computer programs to ultimately estimate and predict objective measures of PD symptoms.

Individuals who have Parkinson's, are over the age of 30, and who own and use a smartphone are eligible to participate.

Collecting data about Parkinson's disease through wearable devices has the potential to revolutionize PD research. To get involved or to learn more about this study, visit michaeljfox.org/wearfoxinsight.