High-Tech Devices Aid Bariatrics

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The fight against fat is going high-tech. To get an inside look at eating and exercise habits, scientists are developing wearable wireless sensors to monitor overweight and obese people as they go about their daily lives.

The experimental devices are designed to keep track of how many minutes they work out, how much food they consume and even whether they are at a fast-food joint when they should be in the park. The goal is to cut down on self-reported answers that often cover up what's really happening.

In a Los Angeles suburb lab, two overweight teenagers help test the devices by taking turns sitting, standing, lying down, running on a treadmill and playing Wii. As music thumps in the background, wireless sensors on their chests record their heart rates, stress levels and amount of physical activity. The information is sent to a cell phone.

“I can't feel my legs,” 15-year-old Amorette Castillo groans after her second treadmill run.

Traditional weight-loss interventions rely mainly on people's memory of what they ate for dinner and how many minutes they worked out, but researchers have long known that method can be unreliable since people often forget details or lie.

The new devices are being designed in labs or created with off-the-shelf parts. Some similar instruments are already on the market, including a model that tracks calories burned by measuring motion, sweat and heat with armbands. But the devices in development aim to feature more precise electronics and sometimes even video cameras. Many emerging systems also strive to provide instant feedback and personalized treatment for wearers.

At the University of Southern California lab, the teens alternated between being sedentary and active as researchers resolved the technical bugs. Later this year, some will wear the body sensors at home on weekends. If they get too lazy, they will get pinged with a text message.

“We'll be able to know real-time if they're inactive, if they're active,” said Donna Spruijt-Metz, a USC child obesity expert in charge of the project. The devices are made possible by advances in technology such as accelerometers that can measure the duration and intensity of a workout. They also use Bluetooth-enabled cell phones that can take pictures of meals and send information back.

Will all this wizardry lead to a slimmer society? Scientists say there's reason to

hope. Getting an accurate picture of what people eat and how often they move around will help researchers develop personalized weight-loss advice for a U.S. population where two-thirds of adults either overweight or obese. This trickles down to children and adolescents who are at greater risk for high blood pressure, high cholesterol and diabetes as they grow older.

On a related front, a federally funded pilot project by the Pennington Biomedical Research Center in Louisiana is also exploring whether people can lose more weight when tracked by technology. Participants carry around Blackberry Curves to snap pictures of their meals and leftovers. They also wear a quarter-sized device on their shoe that counts the number of steps they take.

Counselors pore over the incoming data and give individually tailored health advice through e-mail or telephone. Every month, the participants get their weight checked, and their progress is compared against a separate group that receives only generic health tips.

University of Pittsburgh engineer Mingui Sun has developed a necklace equipped with a video camera that records where a person goes and what he or she eats. Before a researcher sees the data, it's filtered by a computer that blurs out other people's faces.

The device is not smart enough to know whether the wearer ate a Big Mac or tofu. So a researcher inputs the food, and the computer calculates the portion size, calories and nutrients. Sun's lab workers are wearing the prototype, and he hopes to test it on real people by the middle of the year.

On a recent weekday, Castillo and another study volunteer, 13-year-old Eric Carles, headed straight from school to the USC lab, where they strapped the sensors on and went through a sort of circuit training. The project manager timed them as a post-doctoral student recorded the session through a one-way mirror. Through periods of sitting, standing and exercising, they chatted about scary movies and upcoming exams. Wearing the devices felt weird to Castillo initially, but she has since grown used to it.

Castillo admits she doesn't exercise as she often as she would like and has a sweet tooth for chocolate. Carles, who plays after-school sports, confesses he eats a lot. The teens were willing to try anything to help them lose weight. After enduring more than two hours of required physical activity, the two were allowed to do whatever they wanted. Researchers called it free living, and it offered a glimpse into the activities teens would choose when they test the sensors at home.

The two chose to play a music video game. With Castillo on drums and Carles on the guitar, they rocked out to Duran Duran and Bon Jovi as researchers looked on.

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