Device for Remote Patient Monitoring After Knee Replacement Shows Promise

A digital device worn by patients continuously for several weeks after they have had a total knee replacement aims to improve clinical outcomes while reducing costs for this common procedure. The device, TracPatch, is showing great promise to address major barriers that often keep patients from deriving the full benefits of a well-planned and executed physical therapy program.

“We used to send the patient home and tell them to start physical therapy, which they were supposed to schedule two or three times a week,” said Victor Hugo Hernandez, M.D., M.S.,
an orthopedic surgeon with the University of Miami Health System who specializes in hip and knee procedures. He has been deeply involved, since the beginning, in the development and testing of TracPatch.

“Lots of our patients just didn’t go for physical therapy, or sometimes insurance, did not approve the amount of therapy that the patient needs” he said. “For the ones who were willing to go, the system only allows about 12 sessions, even though they might really need more.”

For some patients, transportation to physical therapy was another big hurdle.

“If I treated a patient in the Keys, or central Florida, the closest facility for them for PT would be an hour away from home,” Dr. Hernandez said.

By using TracPatch, a patient can participate in PT at all times that suit them without ever leaving home.

Avoiding the drive to a PT facility can be beneficial for patients even if there are nearby facilities. “Many patients experience considerable pain in the first two to three weeks after a knee replacement,” Dr. Hernandez says. “It’s difficult for them to get in and out of a car.” Doing PT exercises at home can be more comfortable and manageable for many patients.

**Post-operative Care Joins the Digital Age**

TracPatch comprises two pieces that attach to a patient’s leg, above and below the knee, and an associated mobile phone app. The instrument continuously collects activity data which include steps taken, range of motion, exercise compliance, and
temperature fluctuations at the wound site. It relays that data to the health care provider who can review it, track patient progress, and alter the plan of care as needed.

For his patients, Dr. Hernandez attaches TracPatch before the knee replacement, to obtain baseline measurements.

“The patient downloads the app onto their iPhone, and they can contact me directly about any problems they may be having with pain or with particular exercises, or with any other questions, directly through their iPhone,” he said.

Plans are in place to expand this app to other smart phone platforms.

The device lets him see if his patients are doing the prescribed post-op exercises, and how well or poorly they are doing them, he explains. With so much detailed information, he says, he can reach out and support the patient with needed corrections and show them how to perform the rehabilitative exercises. The device also provides some guidance itself.

The communication is reciprocal.

“It’s so easy for my patients to communicate with me,” he said. “They can send me pictures or videos.”

**Seriously Enhanced Follow-up**

Many orthopedic practices typically schedule the first follow-up visit after a total knee replacement four weeks after the surgery, barring the prior appearance of some serious problem, and this was Dr. Hernandez’s approach before using TracPatch.
“It was usually at that four week visit that we’d make a
decision about whether the patient was falling behind,” Dr.
Hernandez says. “The device improves my ability to see how
they’re progressing sooner to that four-week mark, without any
delay whatsoever.”

He said he can address problems sooner, while they’re easier
to manage, which can reduce readmissions.

By providing constant feedback, the device also helps him to
do better at personalizing aftercare, which augments patient
satisfaction.

“We may have asked too much of them at first,” Dr. Hernandez
said. “With this wearable device, we can quickly make
adjustments based on personality, how much they want to do,
and how much is good for them,”

**Well Suited for Patients Today**

The device allows an orthopedist to personalize their
patient’s schedule when it comes to post-operative office
visits. As Dr. Hernandez explains, “If a patient is doing
their exercises regularly, and not having any problems that
need to be addressed, we can schedule a six-week follow-up,
instead of the typical four-week appointment.” which he says
can lighten the patient’s treatment burden.

Dr. Hernandez and his colleagues began working with Consensus
Orthopedics, the TracPatch manufacturer, to develop and test
the device before the pandemic, but COVID-19 has only
intensified forces that make telemedicine of this sort highly
valuable.
“With COVID, it’s harder than ever for patients to get into physical therapy facilities,” he said. “Many patients feel much safer at home.”

He is leading an ongoing clinical trial of the device, trials which involve a sample of 536 patients. This month, Dr. Hernandez, who has no financial stake in TracPatch, will present his findings at the Academy of Orthopedic Surgery meeting. He anticipates publishing the findings shortly after the conference.

**Improvements Will Have Major Impact**

Between 2000 and 2010, approximately 5.2 million total knee replacements took place in the U.S., according to the Centers for Disease Control and Prevention. It was the most frequently performed inpatient procedure done on adults above the age of 45 in 2010. People over 45 accounted for more than 98% of those 5.2 million operations. The mean age for patients has been dropping in recent years.

Since most patients for knee replacement are older, Medicare often covers the procedure and its associated costs. With Medicare now bundling payments, hospitals and health systems are all highly interested in finding ways to save as much as they can while still providing excellent care.

Today, Medicare payment for knee replacement is around $26,000 to $32,000, and one of the most expensive parts of the process is the post-operative care, Dr. Hernandez explains.

“If a patient needs more than the usual amount of rehabilitation or has to be sent to an acute rehab center,
there’s often no money left for those services,” he said. “This new approach to post-operative care can bring a hospital’s spending down, which in turn can save the whole health care system money. It saves patients a lot of pain, time and trouble.”

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