

Opioid Addiction Kills Tens of Thousands of Americans Each Year. These 2 Scrappy Startups Are Trying to Save Those Lives

Opioid abuse is one of America's top public health problems. But these companies have new ways to help.

By Emily Canal, *Reporter, Inc.com* emilycanal

David Nipple was less than two miles from home, and his beloved cats, when he died.

It was around 8:30 p.m. on May 4, 2014, and Nipple was riding his motorcycle eastbound on a Tennessee highway. He checked his rearview mirror, and saw the red glow of his backlight on the blacktop. Then he was blinded by two headlights directly in front of him.

Nipple quickly calculated the height of the vehicle heading toward him--a Chevy Tahoe--and realized he'd either land "in the grill, underneath it or in the windshield." He swerved, but the SUV struck him and sent Nipple flying 30 feet.

He can only recall fragments from the time he spent beside the highway waiting to be airlifted to a hospital. His right hand resting near the knee of his left leg, where four inches of bone protruded from the skin. Seeing several inches of bone sticking out of his left arm, while the night hid the blood pouring from his wounds. Telling the people around him he was worried about his cats--no one had a key to his place, so who would feed them? And the relief at realizing his helmet was still locked on his head as the thunk of incoming helicopter's blades chopped louder and louder. Somewhere in all this, Nipple's heart stopped, hospital staff told him later, but someone was able to revive him.

When he finally came to in the hospital, Nipple's left leg had been amputated above the knee. While he recuperated, though, the pain was unbearable. He suffered from phantom limb syndrome, the excruciating sensation that an amputated extremity is still attached.

"When the phantom pain kicks in, it's like reliving the accident," says Nipple, who's now 62. "The top of the leg is being ripped off to the side and the leg is being twisted."

But Nipple wanted to avoid opioids. He'd seen several



David Nipple, a patient of SPR Therapeutics, stands with his motorcycle in May 2016, two years after the accident that claimed his left leg. *CREDIT: Courtesy David Nipple*

friends get hooked and didn't want that to happen to him. Luckily, he found a different solution. Specifically, a pillbox-size device created by the startup SPR Therapeutics, which treats pain by sending low-voltage electrical pulses to a patient's nerves.

SPR is among a clutch of startups explicitly taking aim at the opioid epidemic. Such startups, unfortunately, have a lot of opportunity. Opioid and heroin-related deaths have skyrocketed in the past decade, thanks to the overprescription of legal painkillers like Oxycontin and an influx of heroin,

which many who are dependent on opioids turn to after exhausting sources for prescription pills. Nearly 35,600 Americans died of overdoses from such drugs in 2015, according to the most recent data available from Centers for Disease Control and Prevention--up from 12,937 in 2005.

To understand the work these new companies are doing, it's worth hearing from people like Nipple--who today is back to riding motorcycles, and whose Facebook nickname "Alien Leg" pokes fun at his prosthesis--and a person Inc. will refer to as Will (who requested anonymity), who is a patient of Groups, which provides affordable treatment to people who are addicted to opioids,

"Sometimes I just sat there and cried," says Nipple, describing his agony while abstaining from substances he feared getting hooked on--opioids, marijuana, and the non-narcotic nerve pain medication Gabapentin. "I've got friends that take Gabapentin and they say its not addictive," he says. "But when you start popping it like candy, that's addiction."

Nipple learned about SPR while browsing a Facebook

page for amputees around a year after his accident. Nipple qualified for SPR's pain study and was outfitted with the company's SPRINT Peripheral Nerve Stimulation System--a small device that physicians attach nonsurgically to a patient's skin, near the afflicted area. A thread-like wire connected to the device is placed under the skin, close to the nerve that's registering pain, to administer electrical pulses. Nipple wore the device for the recommended 60 days--and says he's only felt phantom limb pain twice in the two years since the device was removed.

This is typical of SPRINT users, says Maria R. Bennett, the founder of SPR Therapeutics. "We routinely see a sustained or carryover effect," she says. "Our device is designed to deliver significant relief of pain not only during those 60 days but after the device has been removed."

Bennett launched the Cleveland-based SPR in 2010 and received clearance last year from the FDA to market the SPRINT system for chronic and acute pain. The company also received nearly \$9 million in two contracts from the U.S. Department of Defense to develop SPRINT and specifically target amputees who, like Nipple, suffer from chronic pain caused by nerve damage. Bennett says traditional implantable neurostimulation devices--which provide electrical impulses to treat pain--can cost around \$30,000, but SPR's therapy costs more than 80 percent less.

The long-term goal for SPR is becoming a non-opioid pain treatment for more general use. For example, SPRINT could be used on a patient who's received a knee replacement, a procedure known for its long and painful recovery process. The majority of people who get this operation are prescribed opioids, says Bennett, but SPRINT "could relieve their pain and avoid them ever even taking the opioid or filling that prescription"--the route by which countless Americans became dependent on opioids.

SPRINT could've been helpful for Will, who was prescribed opioids after an Army training injury in 2005. Back then, Will, who's now 33, was carrying a 200-pound rucksack during a drill when he stepped in a pothole and tore his ACL. After finishing his prescription bottle of opioids, Will began using heroin. He saw a doctor to treat his addiction, but after back surgery, he was again prescribed opioids. When that prescription ran out, Will says, he went on a six-month bender.

The article has been edited for brevity



SPRINT Peripheral Nerve Stimulation System. *CREDIT: Courtesy SPR Therapeutics*

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PNS SYSTEM

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SPRINT is FDA-cleared for up to 60 days in the back and/or extremities for: (i) Symptomatic relief of chronic, intractable pain, post-surgical and post-traumatic acute pain; (ii) Symptomatic relief of post-traumatic pain; and (iii) Symptomatic relief of post-operative pain. SPRINT is not intended to treat pain in the craniofacial region. Physicians should use their best judgment when deciding when to use SPRINT.