

**INSIGHT**



## STRIKING ALL THE NERVES

Willoughby company believes it has found quick cure for phantom limb pain

remains long after someone loses a limb, according to results from two clinical trials.

Granted, both trials were small — combined, they included only 15 patients — and the second trial isn't quite finished.

But the results are consistent, CEO Jon Snyder said.

Most of the 15 amputees reported pain levels ranging from 6 to 8 on a scale of 10. Their pain typically dropped to a 0 or a 1 shortly after using Neuros Medical's Nerve Block technology, Mr. Snyder said.

By CHUCK SODER  
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**N**euros Medical Inc. may have the cure for phantom limb pain.

By zapping a bundle of damaged nerves with quick bursts of electricity, the Willoughby company can eliminate all or most of the pain that

One patient told Mr. Snyder the treatment allowed him to sleep through the night for the first time in years. Another no longer needed to take pain medication. And more than one patient said they weren't used to being pain-free.

“I'd ask them, 'When did you have zero pain before?' They'd say, 'never,'” he said.

The results have been so consistent that Neuros Medical's many investors could have the option of selling the company before it starts enrolling patients in a much larger pivotal trial, said Stephen Haynes, CEO of Glengary LLC, a venture capital firm in Beachwood that is one of Neuros Medical's many local investors.

But the investors could generate a bigger payout if they retain ownership, at least until the larger, 100-patient trial is complete, Mr. Haynes said.

How big might that payout be? Consider two previous deals involving local neurostimulation technologies.

NDI Medical LLC of Highland Hills sold its first product — an electrical stimulator designed to help people control their bladders — to Medtronic Inc. for \$42 million in 2008.

Another company, Intelect Medical Inc., hit it big in 2011 when it was bought by Boston Scientific Corp. for \$60 million in a deal that valued the entire company at \$78 million when Boston Scientific's previous stake is included. Intelect moved from Cleveland to the Boston area just before the acquisition was announced.

Neuros Medical could generate a similar payout if the larger pivot trial goes well, Mr. Haynes said. And it should go well, given how consistent the results have been so far, he said.

“You don't have the same potential risk of having a pivotal trial coming back with results that aren't expected,” Mr. Haynes said.



*Photo credit: COURTESY NEUROS MEDICAL*

**The majority of the 15 patients who used Neuros Medical's Nerve Block technology during trials reported a pain level of 0 or 1 on a scale of 10 after using the Willoughby company's equipment.**

Neuros Medical has raised a total of \$7.2 million in capital, including \$1.75 million in convertible debt that existing investors chipped in over the last two months. RiverVest Venture Partners of St. Louis, which has a Cleveland office, led the recent investment.

Now Neuros Medical is planning to raise roughly \$9 million to fund the pivotal trial, Mr. Snyder said.

The technology, developed at Case Western Reserve University, provides extremely fast electrical stimulation to damaged nerves, blocking the pain signals that they send to the brain.

The studies suggest the relief lasts at least a few hours, Mr. Snyder said. When the pain comes back, patients can press a button on a remote control to reactivate the generator that provides the electricity, which flows through implanted leads to reach the damaged nerves. Neuros Medical in January finished developing an implantable version of the Altius generator, which is about one-third the size of an iPhone.

Aside from an injectable drug called lidocaine, which numbs the damaged area, other drugs used to treat phantom limb pain mask it as opposed to getting rid of it, Mr. Snyder said.

## **More hertz where it hurts**

Boston Scientific sees promise in the Nerve Block technology, too. The Natick, Mass.-based medical technology company invested in Neuros Medical last year. Boston Scientific one day could buy the company or form some other partnership, Mr. Snyder said.

The terms of Boston Scientific's investment give the publicly traded company rights other potential suitors wouldn't have, Mr. Snyder said, declining to provide details.

Spinal cord stimulation, a common form of neurostimulation, isn't strong enough to stop phantom limb pain completely, he said. The Nerve Block technology is sufficiently strong because it targets the nerves that cause the problem and hits them with much faster bursts of electricity, Mr. Snyder said.

“Instead of 30, 40, 50 hertz, we're at 5,000,” he said.

### **They have a platform**

Neuros Medical eventually plans to use the technology to treat other types of chronic pain caused by damaged nerves, said Dr. Amol Soin, founder and medical director of the Ohio Pain Clinic, which has four offices in the Dayton area. One big opportunity would be treating patients who suffer from a category of migraine headaches caused by damaged occipital nerves, said Dr. Soin, who led the first two studies.

“This is essentially a platform technology,” he said.

Dr. Soin learned about Neuros Medical because he is one of many individual investors who belong to the Ohio TechAngels investor network, which is based in Columbus. Because he knows a thing or two about treating pain — for instance, he also is president of the Ohio Society of Interventional Pain Physicians — another TechAngels member asked him to review research the group had compiled about Neuros Medical as it prepared to invest in the company.

Dr. Soin was impressed, so he made an investment of his own. He liked the technology because it provided a defined way to treat a big problem that has been around since the days of ancient Egypt, he said, noting that more than 750,000 people in the United States suffer from phantom limb pain.

And few technologies are so effective at treating pain, he said.

“It's really, really tough to get the pain score down from a 7 to a 1,” Dr. Soin said.

### **Job stimulation? Not yet**

But will Neuros Medical be effective at creating local jobs? That isn't clear.

Because the business is small today, employing just seven people, it easily could be moved if it is acquired anytime soon. For instance, it could follow Intelect Medical's lead and move if it is bought by Boston Scientific, which would not provide comments for this story.

Various successful neurostimulation startups end up being bought by big players in health care, according to people in Northeast Ohio's neurostimulation business who spoke with *Crain's* for a 2012 story about the sector's growth. However, there's a chance an acquired company could remain in the region as a division of a larger company, according to some people interviewed.

Plus, some neurostimulation businesses, such as NDI Medical, do remain independent companies.

Some money Neuros Medical has raised came from sources interested in creating jobs in Ohio. Several of its investors — Glengary, RiverVest, the Ohio TechAngels, JumpStart Inc. of Cleveland, North Coast Angel Fund of Mayfield Heights and Queen City Angels of Cincinnati — have received money through either the Ohio Third Frontier economic development program or the Ohio Capital Fund, a taxpayer-backed “fund of funds” that invests in venture capital groups that commit to using at least half the money to finance Ohio-based startups.

But even if the company does move, not all is lost, said Mr. Haynes of Glengary.

“If investors in the region make money on investments in the region, they will make more investments in the region later on and ultimately will create jobs,” he said.