Above: Todd Kozelichki gives his wife, Kim, a pep talk before she takes a balance test while researcher Max Kurz, Ph.D., instructs his assistant, Dave Arpin, how to record the data. Kim is the first participant to finish a promising pilot study for those with Multiple Sclerosis.

Right: Kim Kozelichki credits the PoNS device and physical therapy to her re-gaining the ability to play the piano again. She's also taking walks with her husband, Todd, and their dog, Honey, again, something they haven't been able to do in years.

Web Extra

View a quick YouTube video showing Kim's progress throughout the study.

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Through the generosity of donors, the Train the Brain study will continue on to impact the lives of others with MS, just like it did for Kim, via the University of Nebraska Foundation. Private support plays a critical role in helping MMI achieve its goal to be the premier interdisciplinary center on disabilities in the Midwest. As part of the Campaign for Nebraska, MMI seeks to raise $20 million to fully realize its key priorities. Since the Campaign began in 2005, individuals and organizations have helped the Institute reach approximately 36 percent of this goal. For more information about the campaign,

contact Melonie Welsh mwelsh@nufoundation.org or 402-502-4117.

Train the Brain

Kim Kozelichki took a deep breath and began to walk along a hot pink string on the floor as if it were a tightrope. The way her husband, Todd, cheered her on, you'd have thought the string was 10 feet off the floor.

"Come on, Kim! Go! Go! Go!" he said. When she finished flawlessly, her husband of 17 years stopped recording video on his phone and looked at her. "Wow, Kim. That was unbelievable."

Unbelievable because just mere months ago, Kim wouldn't even attempt to walk along that hot pink string. She was afraid she'd fall over. Diagnosed with relapsing/remitting Multiple Sclerosis (MS) in May 1997 at the age of 26, the former collegiate tennis athlete used a wheelchair for long distances. Tremors forced her to stop using a pen.

Looking at her now, you'd never know thanks to a promising study at UNMC's Munroe-Meyer Institute. Kozelichki is one of five participants in a pilot study to determine if a device called the PoNS, along with a strict regimen of physical therapy, can help those with neurodegenerative diseases regain what they've lost.

A battery-powered device, the PoNS — developed by a trio of researchers at the University of Wisconsin — is placed in the mouth where thousands of nerve endings on the tongue can send messages to the healthy areas of the brain.

The idea is that the stimulation, in combination with therapeutic exercise, helps the brain form new neural pathways for recovering functions like balance and movement. Those skills are vital for those affected by MS, cerebral palsy, traumatic brain injuries, strokes and Parkinson's disease.

"The cool part about the PoNS is that we're actually seeing improvements that restore mobility and balance, which is the complete opposite of what drug therapies are after — slowing the degradation," said Max Kurz, Ph.D., the director of biomechanics at MMI and lead investigator of the study. "For most people with MS, their motor skills get worse. Rarely do they maintain or improve."

Kozelichki takes pills morning, noon and night, but none of those medicines has done what the PoNS seems to do.

"She's gone from dragging a leg to jogging," said Todd Kozelichki. "We can now go for walks together. That's something we haven't been able to do in years."

Kim also can turn on a dime, weave around cones like a seasoned soccer player and climb a flight of stairs without using a railing. The best part — she isn't the only one with positive results. The study, which tracks participants about every four weeks, is putting up some big numbers.

Over an 8-week period, participants are showing 50 percent improvement in postural balance, a 55 percent improvement in walking ability, a 48 percent reduction in MS impact scores and a 30 percent reduction in fatigue.

"You don't need data to see the changes," Kurz said. "But the initial results are larger than we expected. I've never seen that big of a jump."

Still, Dr. Kurz and his team of neurological physical therapists — Reggie Harbourne, Brad Corr and Kathy Volkman — are cautious. After the pilot study is complete, they plan to conduct a study in collaboration with the University of Wisconsin that will test the PoNS against a regimen of physical therapy — rather than in addition to — to see what exactly causes the improvement.

If the PoNS proves successful, Dr. Kurz hopes to start an FDA clinical trial that would lead to the device becoming more widely available. His hope is to return people to their lives pre-neuromuscular disorder.

Regardless, Kim refers to the PoNS as "the miracle unit." She's back on the tennis court again, returning the ball to Todd with her signature forehand

"I feel like an athlete again," she said. "It's given me so much hope."

On the same day of the gait test, Kim had her balanced tested. In her initial test 18 weeks ago, she fell. On this day, the stick figure representation on the computer screen stayed put in the center, wavering only slightly before a green bar popped up on the screen. Green is good. She passed. And for that, Todd only had one thing to say.

"Unbelievable," he whispered. "Just unbelievable."