

The Restorative Power of Neuroplasticity in People with MS

Enabling neuroplasticity in people with MS-related gait deficit can help improve their walking ability and quality of life.

Abigail Cukier

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One morning, Suesanne Polzin got out of bed and immediately fell to the ground. She was paralyzed from the waist down. After many weeks in hospital, Suesanne recovered. Two years later, she experienced temporary paralysis down the right side of her body. After she started getting severe headaches, she was diagnosed with multiple sclerosis (MS).

When someone has MS, their immune system attacks the protective sheath (called myelin) that covers nerve fibres, hampering communication between their brain and the rest of their body. The disease eventually causes permanent damage of the nerves. MS symptoms vary but can include extreme fatigue, lack of coordination, weakness, and vision problems.

Just 21 years old when diagnosed, Suesanne has lived with MS for 45 years, including episodes of paralysis, weakness on her right side, and trouble with her gait, or walking ability.

The adaptable brain

Frustrated with her symptoms, Suesanne started searching for innovative treatments. She soon learned about neuroplasticity, the ability of the brain to continuously reorganize to optimize functioning of neural networks. In functional plasticity, the brain moves functions from a damaged area to an undamaged

area. In structural plasticity, the brain changes its structure as a result of learning.

“If I was learning to play the piano and you scanned my brain after intense training, you would see a difference in the parts of my brain that control my hands, from pre-training,” says Dr. Sukhvinder Kalsi-Ryan, a physical therapist and Affiliate Scientist at the University Health Network’s KITE Research Institute.

Dr. Kalsi-Ryan says that in MS, while maladaptive neuroplasticity leads to a loss of function, rehabilitation can help reduce this loss, or at least help maintain status for a period of time. “For example, with chronic gait deficit, a program to retrain or refine the gait can have a

positive impact on ability and function. Coupling electrical stimulation with the rehabilitation has been shown to amplify the effect,” she says.

Positive things are happening

This has been true for Suesanne, who uses PoNS™, a non-surgical medical device designed to promote new neural connections, which may help improve gait. PoNS Treatment™ combines use of the device with targeted therapeutic activities and is available at a variety of clinics, like Advantage 4 Athletes

in Markham, ON, where Suesanne started her program. The device gently stimulates the surface of the tongue, exciting the neural network flowing to the brain. This is believed to enable neuroplasticity, which may improve lost function. Authorized by Health Canada, the device is intended for use as a short-term treatment (14 weeks) of gait deficit due to mild and moderate symptoms from MS and is

to be used in conjunction with physical therapy.

“I used to hang onto the wall a lot and now I don’t. Instead of dragging my legs, I’m lifting and moving them. They didn’t do that before,” says Suesanne, adding that the treatment, while focused on gait development, is improving her quality of life. “I have a better outlook and attitude. I’m finding more positive things are happening in my life.”



Dr. Sukhvinder Kalsi-Ryan
Physical Therapist & Affiliate Scientist, University Health Network’s KITE Research Institute



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