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Rehabilitation Engineering Laboratory

Each year, more than 1,000 Canadians experience a spinal cord injury or illness, resulting in partial or complete paralysis. Many are males in the prime of life with traumatic injuries, but a growing number of older people are affected by degenerative illnesses and other diseases that damage the spinal cord.

The Rehabilitation Engineering Lab at iDAPT provides a unique environment where scientists, clinicians and students are making advances to help people with spinal cord injuries live fuller, more independent and healthier lives.

The lab is located at Toronto Rehab's Lyndhurst Centre, home to the hospital's spinal cord rehabilitation program, the largest rehabilitation program in Canada for people with spinal cord injuries and related non-traumatic neurological conditions. This setting allows researchers to study patients during early recovery and later when they return to their communities.

One exciting area of inquiry involves functional electrical stimulation (FES), a technique that delivers tiny bursts of muscle-stimulating electrical impulses. The technology has helped some patients with incomplete spinal cord injuries to pick up and hold objects, and even improve their walking. The approach—also used to restore arm and hand motion to stroke survivors— "retrains" people's nervous systems so they can function again, even when the stimulator is taken away.

Building on small-scale studies, the team is further exploring the potential of FES—for example, to support "hands-free" standing.

Researchers are also using electrodes implanted in the brain to "decode" the intentions of a patient— and then using this information to control the patient's environment. The goal: to develop a brain-machine interface that enables people with high-level quadriplegia to control their environment through thought.

Researchers using the lab work in collaboration with scientists and engineers at the University of Toronto and with other Toronto Rehab researchers to advance treatment of functional disabilities.

For more information on the Rehabilitation Engineering Laboratory and iDAPT at Toronto Rehab, please visit www.torontorehab.com or contact Dayle Levine, iDAPT Project Manager, at 416-597-3422, ext.7602 or by email: levine.dayle@torontorehab.on.ca.

IDAPT is Toronto Rehab's $36 million rehabilitation research initiative to develop one of the world's most advanced rehabilitation research facilities where new therapies and assistive technologies will be developed for older people and those living with disabling injury or illness.