

Robot Assisted Walking Therapy

Robots can now help people with brain and spinal cord injuries learn to walk again. With the Lokomat System, a new treadmill technology created by the Swiss company Hocoma, a computer and robot quickly teach walking movement and corrects gait by moving the patient's legs in a way that mimics walking.

The Lokomat suspends a person in a skeletal, robot frame over a treadmill. The robot is attached by straps to the outside of the person's legs. The Lokomat then moves the legs in a natural walking pattern, while a computer controls the pace of walking and measures the body's response to the movements.

The Lokomat provides users with a repetitive walking pattern, which helps re-route brain signals that are interrupted due to injury or illness.

"Its scientific foundation is really based on animal models," Dr. Edward Dabrowski explained. "If you sever the spinal cord of a cat, for example, and suspend him on the treadmill, he'll walk." Dr. Dabrowski is chief of the Division of Physical Medicine and Rehabilitation Services for Children's Hospital of Michigan and the Medical Director for Pediatric Services at Rainbow.

"How could he walk when the brain isn't connected to the spinal cord?" Dr. Dabrowski asked. "Or the spinal cord isn't connected to the legs anymore? It's telling you there are independent generators in the spinal column that generate walking."

The Lokomat helps to reduce the physical strain of therapy for therapists, improves efficiency of gait training for patients, and improves leg movement and lateral balance for the patients. Currently, this type of therapy takes the work of at least two therapists without robotic assistance because they must manually move the patient's legs in a walking pattern. With the Lokomat, the robot helps patients walk throughout therapy. Therapists only help as needed, thus pushing patients to their full potential.

"The Lokomat reduces the work of the therapist and allows for consistent therapy. We know exactly how fast the patient is walking and how much weight they are bearing. Rehabilitation efforts are consistent, repetitive and precise," Dabrowski explained. In addition to the spinal cord population, those with brain injury, cerebral palsy, etcetera, can also benefit from this technology.

First approved by the Food and Drug Administration in March 2002, the Lokomat may also help to strengthen muscles and



improve circulation.

Many health care insurance providers cover robot-assisted walking therapy. This therapy is available at a variety of locations, including hospitals and rehabilitation centers. More information on the Lokomat is available on Hocoma's Web site at: www.hocoma.ch/en/products/lokomat. ❖

About the Researcher

Dr. Edward Dabrowski, MD, has a medical degree from Wayne State University School of Medicine. He is board-certified in physical medicine and rehabilitation. Dr. Dabrowski has extensive faculty and professional appointments. He currently serves as chief of the Division of Physical Medicine and Rehabilitation Services for Children's Hospital of Michigan and pediatric program medical director at Rainbow Rehabilitation Centers. In addition, Dr. Dabrowski is program director of the combined pediatric/PM&R residency program and codirector for the Muscular Dystrophy Association of Southeastern Michigan. Dr. Dabrowski specializes in pediatric traumatic brain injury, neuro-muscular conditions and spasticity.

Robot Assisted Walking Therapy *continued*

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