

NEWS RELEASE

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Changing Landscapes: Emerging Technologies to Treat Stroke

Physical therapists work to achieve faster and more aggressive recovery

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ALEXANDRIA, VA—Stroke is the third leading cause of death in the U.S.* and the leading cause of serious long-term disability. It can result in temporary and/or permanent damage, limiting one's movement, balance, and coordination. Now, more than ever, stroke survivors, through physical therapists, have access to more aggressive and advanced technologies designed to help restore them to the highest level of function possible. As experts in restoring and improving motion in people's lives, physical therapists play an important role in recovery from stroke and the development and utilization of the latest treatment advancements.

A stroke occurs when a blood vessel carrying oxygen and nutrients to the brain is blocked by a clot or bursts open, resulting in lack of oxygen to the brain, which can impact one's mobility, among other things. When a stroke occurs a physical therapist begins treatment soon after to help the patient address his/her mobility issues.

"Studies have shown that earlier, aggressive interventions produce better outcomes in patients with stroke^{1,2}. Advanced technologies can be instrumental in attaining those outcomes," says APTA spokesperson Alison Lichy, PT, DPT, NCS. "More often now, you will see the physical therapist also working behind the scenes in research and development of these technologies, which benefits patients and adds a unique perspective on research. Who better to investigate and help develop the technologies that help patients regain mobility than the experts who implement the treatment programs for the patient in the clinic?"

Many emerging technologies address common stroke-induced mobility deficiencies such as paralysis and weakness. To give an idea as to what is on the horizon, here are just some of the new innovations** physical therapists are using:

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- **ZeroG**

This is a unique and dynamic over ground gait and balance training system that combines new technology with established treatment techniques (body weight supported gait training). Developed with the input and feedback of physical therapists, it is designed to aggressively treat patients early in their rehabilitation process. The therapist can control the walking speed of the patient, the amount of body weight support provided, and how much the patient will be allowed to fall before the system catches them. It also allows the patient to perform a variety of activities under partial weight support, such as walking with or without an assistive device, stepping over obstacles, performing high level balance activities and practicing sit to stand. A pilot study is being conducted by physical therapists to determine if training with the ZeroG will benefit people with significant lower limb impairments to begin training earlier after their injuries and focus on re-establishing symmetrical gait patterns rather than adopting compensatory strategies (visit www.moveforwardpt.com to see how it works).
- **Ness L300**

This technology was designed to improve walking in people that have foot drop, a side effect of stroke. Strapped around a patient's lower leg, it helps retrain the feet and legs to relearn walking patterns by delivering electrical pulses to the nerve in the patient's leg, which controls the movement of the ankle and foot muscles. A sensor in the shoe detects when the foot is in the air or on the ground and sends information to a control unit telling it when to raise and lower the foot during walking.
- **MIT Manus**

This device for post stroke upper extremity (UE) rehabilitation allows movements in 2 dimensions, and measures and provides forces at the endpoint (a handle grasped by the hand). A monitor in front of the patient displays their current hand position and representation of a "target" position toward which they must move their hand. Forces can be applied to the hand to directly resist movement or to assist the movement. Forces can also be provided to push the hand off course to require an active readjustment of the arm to reach the target.
- **Tailwind**

This portable table top device was developed and invented by physical therapists to improve arm function and range of motion in stroke patients. Suitable for home use, the Tailwind consists of two moveable handles on independent resistance-free tracks. The patient moves the handles along each track at a certain starting mark, in response to auditory cues. The combination of the repetitive arm movement with sound and visual cues is thought to trigger the part of the brain that controls mobility in the arm.

"I could not walk after my stroke in late February of this year. Because of my weakness and fear of falling, I was not sure how I was going to relearn and get on my feet again," says Dennis McClearn, a patient at the National Rehabilitation Hospital (NRH) in Washington, DC, where the ZeroG was invented. "However, once I was strapped into the ZeroG system, my fears subsided and I could focus on putting one foot in front of the other. Today I am walking and using the stairs, using a cane as needed. I would not have come so far without this new system and my physical therapist."

Because many of these technologies are so new, evidence citing their effectiveness is still a focus of research. However, physical therapist Kathy Brady, PT, of NRH, has witnessed significant recoveries in stroke by using some of these technologies. "Technologies, such as the ZeroG, provide the ability to practice tasks with greater repetition, which can result in faster recovery and this allows us to be more aggressive in our treatment of the patient. Research has shown that early, high intensity interventions are strongly correlated with gains in walking ability and function^{3,4}."

Physical therapists are experts in restoring and improving motion in people's lives. In many cases, they can treat pain without surgery and reduce the need for long term use of medications and their side effects. For more information on how physical therapists are working with advancements in stroke technology and with patients who have had stroke, visit www.moveforwardpt.com.

In most states, you can access a physical therapist directly. To find one in your area please visit www.moveforwardpt.com/findapt.

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The American Physical Therapy Association (APTA) represents more than 74,000 physical therapists, physical therapist assistants, and students of physical therapy nationwide. Learn more about conditions physical therapists can treat and find a physical therapist in your area at www.moveforwardpt.com. Consumers are encouraged to follow us on [Twitter](#) (@moveforwardpt) and [Facebook](http://www.facebook.com/move4wardpt) (www.facebook.com/move4wardpt).

*American Stroke Association

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¹ Stroke rehabilitation patients, practice, and outcomes: is earlier and more aggressive therapy better? Horn SD, DeJong G, Smout RJ, Gassaway J, James R, Conroy B. Arch Phys Med Rehabilitation I. 2005 Dec; 86 (12 Suppl 2):S124-S125.

² Timing of initiation of rehabilitation after stroke. Maulden SA, Gassaway J, Horn SD, Smout RJ, DeJong G. Arch Phys Med Rehabilitation. 2005 Dec; 86 (12 Suppl 2):S34-S40.

³ Intensity of leg and arm training after primary middle-cerebral-artery stroke: a randomized trial. Kwakkel G, Wagenaar. RC, Twisk JW, Lankhorst GJ, Koetsier JC. Lancet. 1999 Jul 17;354 (9174):191-6.

⁴ Factors affecting functional outcome after stroke: a critical review of rehabilitation interventions. Cifu DX, Stewart DG. Arch Phys Med Rehabilitation. 1999 May;80(5 Suppl 1):S35-9.