New electrical stimulation technology may hold the key to allowing stroke victims walk again

Electrical stimulation is a technique that has been used in rehabilitation and sports medicine for years. The technique applies electricity to a muscle causing it to contract involuntarily, helping to tone and build muscle tissue.

A researcher from the University of Florida named Warren Dixon believes that electrical stimulation could hold the key to allowing people who have suffered from a stroke or paralysis to walk again with a normal gait. Dixon believes that by combining electrical stimulation with sophisticated computer learning technology, those suffering for different types of paralysis could possibly regain natural control of their muscles.

Dixon said in a statement, "It's an adaptive scheme to do electrical stimulation more efficiently, with less fatigue and more accuracy."

Dixon and his research staff believe that stroke victims would be the first to benefit from the new technology. After a stroke sufferers often unknowingly drag their toes when walking, leading to falls that often cause more complications and setbacks.

Dixon and his team hope that theircomputer-adapted electrical stimulation technique can be used to prevent stroke patients from dragging their toes. The goal of the researchers is to develop a pacemaker size device that is wearable and can deliver stimulation to the calf at the precise moment it is needed getting the person to raise their toes enough to avoid a fall and restore the natural gait.

The device would be able to adapt to an individual by adjusting itself to weight, activity, and diet according to Dixon, allowing it to act as a sort of robotic therapist for the patient. The device would guide the patient by providing stimulation to the muscles when needed, while at the same time slowly reducing its own input until the patient is able to control their muscles precisely without stimulation.

The electronic stimulation would be applied to the muscles by placing pads on the skin and applying a small current through the pads. The wearer would only feel a tingling sensation at the site, much like wearing a TENS unit often prescribed by a physician for pain management.

Electrical stimulation has a somewhat bad name thanks to being a component in some gimmicky items like products designed to build abs without working out. The researchers point out that there is already one commercially available product on the market that uses electrical stimulation to assist users with weakened muscles. The product is a walker that uses pre-programmed electrical stimulation to help paralyzed people stand up.

Dixon says that these products show the potential of the technology, but they only provide a predetermined and relatively high voltage to the muscle, which can lead to fatigue and muscle soreness. Dixon and his students are attempting to apply adaptive learning to the technology and provide the capability to learn from the users actions and adjust the strength of the voltage accordingly.

Dixon said, "We start with a desired trajectory, we do the leg extension, encode that in a

computer and measure the motion. Then we develop control methods to intelligently stimulate the muscle to make it behave the way it should."