Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

1475 N. Scottsdale Road, Suite 200
Scottsdale, AZ 85287-3538
Phone: 480 884 1996 Fax: 480 884 1984

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Inventors

Vishvak Rangarajan
Devin Dhooge
Kiryl Sheleg
Nicholas Holmes
Jeffrey Kleim

Contact

Jovan Heusser
jovan.heusser@skysonginnovations.com

Vagus Nerve Stimulator for Post-Stroke Recovery

Stroke is the leading cause of disability in the United states, costing nearly $34 billion in care, annually. Rehabilitation helps patients relearn skills that may have been lost due to stroke, however, many patients do not receive the proper physical therapy required for mobility improvement and independence. Further, the efficacy of rehabilitation wanes the further out a patient is from stroke; thus, time is of the essence. Vagus nerve stimulation is one approach to rehabilitation that has been shown to result in improved post-stroke outcomes. Most devices have limitations, though, primarily with the need for surgical implantation and readjustment by a therapist.

Researchers at Arizona State University have developed a novel approach to post-stroke neurorehabilitation by coupling vagus nerve stimulation (VNS) with physical therapy. They've developed a minimally-invasive VNS device which stimulates a particular region in the vagus nerve that can be accessed externally; thus, it does not require surgical implantation. This device is automated such that stroke patients can complete their rehabilitation training at home without the need for a therapist or readjustment.

This novel device and method device demonstrate a successful new approach for better post-stroke neurorehabilitation which can be performed without surgery and at home.

Potential Applications

- Mobility treatment and therapy
  - Post-stroke neurorehabilitation

Benefits and Advantages

- Closed loop – only stimulates in response to user input, eliminating the need for a therapist to reassess and adjust and resulting in better outcomes
- Minimally-invasive – does not require surgical implantation
- Produces better forelimb recovery compared to rehabilitation without

stimulation

- The device has been shown to produce a safe and reliable waveform for VNS
- Allows patients to perform rehabilitation in the comfort of their own home

For more information about the inventor(s) and their research, please see

Dr. Greger's departmental webpage

Dr. Kleim’s departmental webpage