

Walking device helps people get back in step

June 7 2013, by Alysa Hullett

Carl Simmons regularly used to run 5K races. Now the 76-year-old stroke survivor just wants to be able to keep up with his wife on a walk. Through help from Seattle-based Cadence Biomedical's walking device, Simmons is hopeful.

The Lynnwood, Wash., retiree is one of several dozen patients using the Kickstart Kinetic [Orthosis](#) since the device's September 2012 debut. Intended for those with mobility impairment resulting from strokes, spinal-cord injuries, [traumatic brain injury](#) or ALS, Kickstart, a wearable [mechanical device](#) that uses [kinetic energy](#) to help improve people's gait, is even helping people who have been "stuck in [wheelchairs](#) for decades," CEO Brian Glaister said.

Five years ago, Simmons ran farther than most men his age; he chose to work at his air-conditioning-and-heating job at a time many would have retired. But joint failure led to knee-replacement surgery. Then came a stroke that crippled his right side. When he walked, "trusty cane" in hand, his right leg dragged on the ground. He trudged along slowly.

"I'm always bringing up the rear," Simmons said.

Upon being fitted for the five-pound Kickstart device, Simmons said he could immediately feel the difference.

"It straightens my foot out right away," he said. "It makes my steps more pronounced."

The Kickstart resembles a leg brace and was inspired by stretchy horse tendons that store energy, allowing the animals to run all day and not get tired, Glaister said.

Springs connected to pulleys attach at the ankle and hip flexor and create tension, propelling the opposite leg forward with each step.

After hearing about the device from a friend, Simmons visited a physician to see whether he was a good fit. The doctor wrote Simmons a prescription for the device.

Sarco Precision manufactures the Kickstart components and Independent Tech Service in Sumner, Wash., assembles and customizes them.

Cadence Biomedical, born out of Glaister's basement, was co-founded in 2007 by Glaister and friend and former colleague Jason Shoen. Previously, the pair worked on a project at the Veterans Affairs Center of Excellence for Limb Loss Prevention and Prosthetic Engineering in Seattle.

But when people asked when the pricey robotic limbs they were developing would be available for in-home use, Glaister said he had to say "probably never."

As a result, the conversation shifted toward affordable technology that people could actually use, Glaister said. In 2010, the pair built the first Kickstart prototype.

Free of motors and batteries, the Kickstart competes mainly with products ranging from an inexpensive ankle brace to the exoskeleton, a robot assistive-walking device that can cost up to \$100,000, he said.

While the exoskeleton is available for in-office physical-therapy sessions, Glaister contends that a few therapy visits are not enough to properly retrain the muscles.

Chie Kawahara, vice president of product management at Cadence, said exoskeleton technology is necessary for people who are paralyzed or who can't walk on their own. Meanwhile, Kickstart is intended for people who need extra assistance to walk normally.

"It takes 1,000 steps a day to recover from a stroke," Glaister said. "If you're not able to take those steps, or not able to take them properly, then you're kinda out of luck."

Orthotist Julie Schaar of Seattle's Center for Prosthetics Orthotics, who custom-fit the device for Simmons, agreed that [stroke](#) patients who "aren't supported in the right way develop poor [gait](#) habits."

Operating out of a small office in Seattle, Cadence Biomedical has five full-time and three part-time employees. It has raised \$1.7 million from investors, and \$600,000 in grants from the U.S. Department of Defense and National Institutes of Health.

So far, private insurance users have paid up to \$1,000 for the device. Cadence is currently working to raise the slight Medicare reimbursement, as patients have paid out-of-pocket costs of \$5,000 to \$6,000. War veterans are completely covered for the device.

With the overarching goal of helping people walk, the Cadence team is working on another version of Kickstart for use in physical-therapy sessions and a product to provide sensory feedback for those who have lost limbs.

Three weeks after Simmons' introduction to Kickstart, he said he's

"never felt better." Walking to the mailbox is a little easier; trekking up stairs is a little less daunting. And he's catching up with his wife, Peg. The pair stroll around the neighborhood, "cul-de-sac after cul-de-sac."

Now, he hopes to get out on his boat more and eventually start ballroom dancing again. He said he just wants to be able "to do all the normal things that couples do."

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