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Walking This Way

KineAssist offers therapists, patients new options

By Rob Senior

Recently, robotic devices have become a hot topic in rehabilitation. Their ability to assist patients, while freeing therapists to observe patients' progress, have obvious advantages for both parties.

But some professionals have pointed out that these devices do a little too much work for the patient, causing the individual's progress to slow. After consulting with rehab professionals about this concern and others, the team at Chicago PT set out to alleviate those nuances with a new device.

The result was the KineAssist (pronounced KIN-knee Assist), a robotic application designed to aid adults who are re-learning to walk safely.

"The device was developed by clinicians, along with an engineering team," said David Brown, PhD, PT, co-founder of Chicago PT. "We wanted to learn from clinicians what major obstacles they face in working effectively with patients who have balance or gait problems."

The robotic technology was such that it was able to sense or anticipate the intended movement of the patient, and follow accordingly. The robot was designed not to interfere—only catching the patient if he lost balance—but to provide enough assistance so as to enable the PT to perform other tasks.

"The need to hold on to patients to prevent them from falling interferes with PTs' abilities to use their hands more creatively and intelligently to help a person learn to move better," explained Dr. Brown. "We've created a way for clinicians to perform challenging interventions for patients with balance and walking disorders. Clinicians can challenge their patients while providing safety."

Working in education in the physical therapy and human movement sciences department at Northwestern University in Chicago, faculty routinely teaches students to perform advanced manual skills and techniques with patients. However, this becomes impossible in some clinics due to safety concerns. This inspired Dr. Brown to enable clinicians to do what they were trained to do—use their skills in creative, intelligent manners.

Additionally, recent research has exhibited the plasticity of the brain. The organ has a great ability to re-wire itself if the nervous system is appropriately challenged. "If you ask a person to attempt a challenging task—one that's a little risky—the brain carefully attends to the task, and tries to figure out a solution, so the person can try to move within that situation," said Dr. Brown.

Allowing this sort of thing to happen was another of Dr. Brown's primary motivations in designing the KineAssist. The device, which is also compatible with other programs such as body-weight supported treadmill training, accurately records performance data for an individual patient and reports objective measures of progress.

How Has It Worked?

The researchers and designers of KineAssist recently were presented with a 2005 Industrial Design Award, honoring the process by which they created the device. Dr. Brown explained that the typical model is for engineers to develop a new technology, followed by finding a way to apply it to the medical world.

But in this case, the process was reversed, with Dr. Brown and his team consulting clinicians, then seeking to develop their preferred technology.

Despite the accolades, Dr. Brown acknowledged that work remains to be done. "We're still trying to tweak the machine to make it better mechanically," he admitted.

Thus far, KineAssist has been used exclusively to help two different groups of patients. "We're aiming for focused feedback, rather than using it on many patients," explained Dr. Brown.

The first group is comprised of patients who are fairly well recovered in terms of regaining their ability to walk, but who still face some limitations. These patients typically present some risk for falling or instability during movement. Therapists are developing challenging exercises, such as stair climbing or balancing on one leg, for these patients.

The second group consists of weaker patients—those in very early stages of walking recovery. For these patients, the objective is


more basic—seeing whether the device is effective and comfortable, rather than using it for more specific tasks. "With both of these groups, we feel that we're on the right track," said Dr. Brown.

Recently, the team at Chicago PT progressed to the point of training other therapists to use the device. While it's too early to establish results, Dr. Brown said that therapists are quite enthusiastic to learn to use KineAssist.

"Other technologies grab onto and engulf the patient, in turn eliminating the therapist [from the process]," he pointed out. "With KineAssist, we're offering therapists an opportunity to interact with technology and think as clinicians."

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