



Indego® Exoskeleton Helps Outpatient Facility Meet Expanding Community Needs

Staff say powered exoskeleton makes sessions for stroke patients more efficient, effective and improves patient outcomes

Shannon Lepper, PT, MHS, CBIS, has seen a lot change in her 25-year physical therapy career. In her role as the administrative director for outpatient medical rehabilitation at Ability KC, an outpatient therapy center in Kansas City, Missouri, she aims to further the organization's mission to fill any care gaps in the community. An important aspect of this is ensuring that they offer their patients – and the inpatient facilities that refer them – access to the best-available technologies and therapeutic approaches.

In pursuit of this goal, in 2018 Ability KC added to their practice the Indego® Therapy, a powered exoskeleton that offers clinicians the ability to provide highly individualized gait training and neurological re-education to patients who have suffered a spinal cord injury or stroke.

Meeting the specific needs of stroke patients

Each year, around 800,000 people in the United States suffer a stroke or cerebrovascular accident (CVA). Of those, approximately 200,000 experience lower-extremity hemiparesis causing gait impairments that prevent them from being able to walk unassisted.¹

Patients who arrive at physical therapy after having experienced a stroke present unique challenges to a physical therapist (PT), including:

- perceptual and visual issues
- difficulty achieving midline alignment

- “pusher syndrome”, a disorder following left or right brain damage in which patients push away from the nonhemiparetic side, causing loss of balance
- weakness often associated with hemiparesis
- gait impairments

“With stroke patients, we’re really trying to retrain whichever side of their brain has been affected and ultimately help them regain a ‘normal gait pattern,’” says Sarah Schmith, PT, Ability KC. “In therapy, Indego helps support patients through a normal gait that they no longer have on their own by helping them equalize their weight bearing and improve standing and walking endurance, which are critical to helping them regain the ability to walk.”

¹ Roger et al 2011 *Heart Disease and Stroke Statistics – 2011 Update*



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Normalizing gait mechanics, reducing compensatory strategies and refining the gait pattern are common therapeutic goals for a stroke patient. Indego facilitates progress in all of these areas, and treatments with Indego align with multiple principles of motor learning and neuroplasticity. From task specific, highly repetitive exercise to target complexity and error-based learning, the Indego can be used as a tool to help patients achieve their therapeutic goals. In addition to being able to bring a stroke patient through a normal gait pattern, using the Indego allows a patient to experience more repetitions in an hour-long session. This is highly beneficial to the patient, and also helps reduce therapist fatigue. Patients are able to get salient and challenging therapy sessions that can be modulated by the therapist in real time when using Indego.

“Many of the perceptual challenges stroke patients face are difficult to address, mainly because getting upright can take so much effort on the part of the patient and the therapist and then fatigue sets in,” says Lepper. “Having the ability through Indego to keep the patient upright allows them to maximize repetitions, which really elevates our ability to be more functional in our treatments.”

Creating individualized treatment plans

Individualizing treatment plans is critical to optimizing patient outcomes because symptoms vary considerably from patient to patient. Indego is expanding the level of individualization Ability KC can offer patients by allowing PTs to quickly adjust the hip component, upper legs and lower legs while the device is donned. This makes it easy to get the patient into the device and fine-tune settings as needed during a session.

There are also two software suites – Motion+ and Therapy+ – which allow the therapist to choose the level of support appropriate for the patient based on the patient’s impairments and therapeutic goals. Therapy+ contains features that address the specific needs of stroke patients, including gravity reduction that lessens the weight of their leg, allowing the patient to move more

easily through the gait cycle; adjustable stance support that can be tailored to each patient's unique stance goals; and active swing where PTs can lessen or increase support at the hip and/or knee on each leg independent of the other during the swing phase of their gait.

"The capacity to adapt and individualize the Indego for each patient is fantastic," says Schmith. "For someone with a CVA, we're able to take the decrease the support the machine is giving independently on each leg, allowing the patient to actually get a lot more use out of it."

Delivering the best care possible

Since obtaining their Indego Therapy in 2018, Ability KC has seen an increase in the number of new patients admitted. They are on pace in 2019 to have a record year in which they expect to admit nearly 600 patients, almost 30 more than in 2018. While Lepper can't correlate the increase directly to adding the Indego, she believes it has helped present their facility as leading-edge, and knows anecdotally that patients are enthusiastic about using the Indego and speak positively about it at their follow-up inpatient appointments.

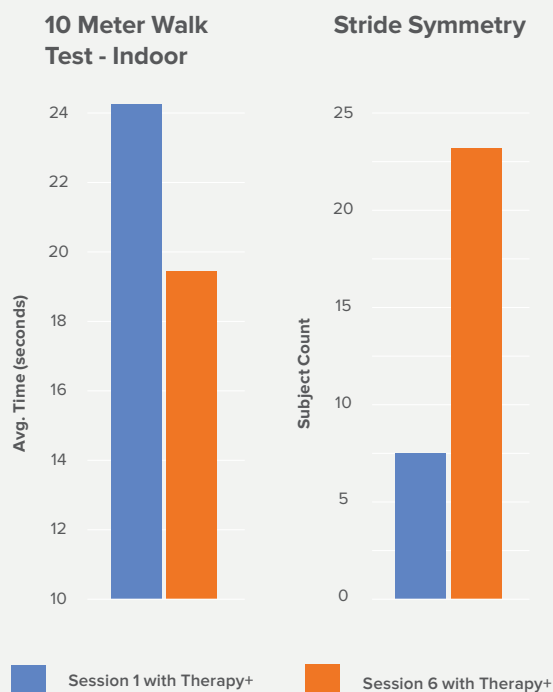
Some research supports the benefits of powered exoskeletons to facilitate walking post-stroke. A 2014 study found that "in a series of sessions in which each patient used the exoskeleton, all patients showed substantial single-session improvements in all measured gait outcomes."² Single-session improvements included increased fast gait speed, stride length and decreased step length asymmetry.

While Ability KC hasn't conducted formal outcome studies yet, Lepper says that they are seeing improved outcomes

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Gait Improvement with Therapy+



Data taken from 42 subject multi-center trial utilizing Indego's Therapy+ Software

in stroke patients who receive treatment with the Indego.

"When your very experienced staff who are used to predicting patient outcomes are upping the goals they set at intake because they're seeing faster improvements, that's a pretty strong indicator that the device is doing its job and helping patients," says Lepper.

Take Ed, a patient who suffered a post-operative stroke in November 2018 and started therapy at Ability KC in February 2019. At intake, he struggled with pusher syndrome, motor planning and could not sit safely in a chair unassisted. After a few months of therapy focused on motor planning, core/trunk control, reaching and finding his center, he began therapy with the Indego.

"Indego allowed him to be able to walk further and longer and not require so many verbal or tactile cues," says Schmith. "Indego forced Ed to go through a proper gait pattern so he could speed up retraining his brain."



As for Ed, he recognizes that he is reaping the benefits of that training.

“The Indego helped me think about the process of walking again, which is a lot because at one point I wondered how anyone could ever walk again after a stroke because it seemed so hard,” says Ed.

In addition to the tangible benefits of the Indego, Lepper says patients experience a psychological boost knowing they have access to leading-edge technological advancements. In that regard, Indego has contributed significantly, and she says the PTs see a lot of value in having access to it.

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