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Walking Away from Paralysis

By Jeffrey Kluger

The best moment in Reneé Ford's life came the day her son Chase, then 2, tried to kick his doctor. It was July 2005, and that angry gesture marked the first time the boy had moved below the neck in more than a month.

These days when you look at Chase, you don't at first notice any sign of what happened to him that year--not the fall he took while jumping on the couch nor the paralyzing blow to the neck as he hit the wooden armrest. More and more, Chase can do the kinds of things any other 4-year-old can do. He can walk, albeit with the aid of trekking poles. He can hold a cup and pick up an M&M. He's regained at least some sensation.

"When he got hurt, I asked one doctor the prognosis," says Reneé. "He said, 'Your son is going to be in a wheelchair forever.'" Instead, Chase is joining a growing number of people defying such grim predictions.

The late Christopher Reeve, paralyzed in a 1995 riding accident, made headlines five years ago when he announced that he had regained some sensation and motion throughout his body, thanks to a regimen that included being suspended by harness over a treadmill while therapists moved his legs through a walking gait. The therapy, known as locomotor training, was said to take advantage of the fact that the spinal cord is hardwired with a sort of backup program for walking, one that can take over when signals from the brain quit.

But there were doubters. Reeve was just one person--and a wealthy one too, who could afford the bes

care. In the 2 1/2 years since his death, however, locomotor training has gone mainstream, with at least 17 hospitals and rehab centers in the U.S. and a handful in Canada and Europe offering it. So far, the patients who have undergone the therapy number only in the hundreds, but about a third of them have been 21 or younger, a fact that is not only helping doctors spare the very patients in whom loss of mobility hits the hardest but also revealing much about how the nervous system works.

Locomotor training was a long time in coming. In the 1970s, investigators at the Karolinska Institute in Stockholm first discovered that paralyzed kittens could be trained to step by placing their back feet on a surface and manually walking them. In 1997, physiologist Reggie Edgerton, who had conducted the kitten studies and had since moved to UCLA, got Reeve onto a treadmill and put him through some therapeutic paces. Two years later, Reeve's foundation launched its NeuroRecovery Network, sponsoring locomotor work at seven hospitals and therapy centers across the country, including the Frazier Rehab Institute in Louisville, Ky., where Chase undergoes therapy.

One of the first people who got a look at Chase when he arrived at Frazier was physiologist Susan Harkema. She rigged him into a baby-size treadmill harness and walked him for 30 minutes as he howled and protested. It was as she was taking him down that he delivered his surprising kick. Treadmill work alone did not get Chase moving. He receives traditional therapy to get his legs bearing as much weight as possible, to help him recognize sensory cues and to teach him such basics as how to swing his arms when he walks. And he has one more thing on his side: his age. Damaged central-nervous-system cells may not regrow readily, but the ones that survive a trauma can become more efficient, changing what is known as their central state of excitability--or the threshold at which even a sputtering signal can send them into action. "I don't think any scientist would dispute that a younger body is more plastic in this way," says Harkema.

Locomotor retraining is not a fix but a way to make the most of what a patient has left. It's less helpful when the spine is completely severed--by, say, a gunshot. This prevents the brain from getting any signals downstream. But most injuries are not so complete. As long as some links are present, so is potential. "The spinal-cord networks become optimized for the new situation," Harkema says, "and the brain changes as well." As that happens, entire lives--many that have just begun--change too.

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