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Stroke victims used to face a lifetime of disability. Now, near-total recovery is possible. But it takes a lot of work

By **Mary Carmichael**
 Newsweek

March 8 issue - It was a truism, conventional wisdom, a nasty fact of life. For years, doctors insisted that after the initial six-month recovery period, stroke victims could not improve substantially. Traditional rehab focused on compensation: teaching a patient who lost the use of his right hand to write with his left. Little attention was paid to the affected side of the body. Stroke, after all, kills brain cells, and no one expected the brain to heal, especially years after a stroke, since it cannot regenerate.

When Liz Layug had a stroke two years ago, she thought she'd never walk normally again. Three weeks of rehab didn't do much to change her mind. She went home from the hospital in a wheelchair, her left leg immobilized by a brace, her left hand immobilized by her brain's inability to command it. She couldn't drive, and even after she rose from the wheelchair on two legs again, she could barely cross the street in the time it took for WALK to click over to DON'T WALK. It's easy to assume that the glittery 1.5-inch heels in her closet today are merely souvenirs from her previous, carefree life. Certainly no one would expect her to wear them salsa dancing.

But the shoes are new and the patient is out on the dance floor once a week. The truism, it turns out, was false. Layug, 51, is one of a growing number of stroke victims who have made near-total comebacks thanks to new rehab programs that prolong the recovery process for months or even years. At UCLA, where Layug was treated, and a few other medical centers around the country, doctors are experimenting with machines that stimulate parts of the body the brain has forgotten how to use. The results have been the best that medicine could hope to offer: the victims of stroke, the country's leading cause of long-term disability, are starting to get their lives back.



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The new approach is based on new ideas about how the brain works. Experts say if the stroke-damaged area of the brain is not destroyed—if the

patient retains at least 10 percent of the relevant nerve cells connecting the brain to the spinal cord—it may be able to regain its function, mainly by recruiting nearby neurons for tasks they never did before. These neurons, now connected to the damaged cells, may sprout new dendritic spines, tiny regions that store memory. And scientists may have been wrong to assume that regeneration was wholly impossible: according to UCLA neurologist Bruce Dobkin, a few new neurons from far-flung parts of the brain may migrate to the area of the stroke.

But it all depends on whether the patient is willing to work hard, and long, at relearning life's most basic tasks—talking, walking, opening a clenched fist, to say nothing of salsa dancing. Dobkin calls it "activity-dependent plasticity." It is remarkably similar to the process a healthy brain uses to learn a new skill. "If you wanted to learn to play tennis, three weeks of lessons, even two months, wouldn't be enough," he says. "The most important part of rehabilitation is to practice."

So practice, practice, practice is what patients do under the new regime. Some log time in Dobkin's "Lokomat," a robot that guides their weakened limbs as they try to walk on a treadmill. Others use Zynex Medical's Neuromove, a small device for at-home use introduced in late 2003. Like the Lokomat, it stimulates muscles when it senses, via electrodes, that the patient is trying to move them. Other docs are trying more- unorthodox approaches. John McGuire, of the Medical College of Wisconsin, is one of several scientists using Botox to stop the muscle spasticity that renders some stroke patients unable to use their fingers. And patients at Julius Dewald's clinic at Northwestern University play "video-games" that force them to extend their elbows, a task difficult for many stroke victims. Dewald has seen a patient accomplish the goal in just eight weeks of training—after 10 years of disability. He and others are also running preliminary trials on several drugs; the most promising replenish neurotransmitters like dopamine and serotonin that enhance the ability of neurons to "relearn" a task. "There is untapped potential," he says, "provided you push the right buttons."

And provided you have enough money. The new rehab can be extremely costly, and its demands on patients' time can keep them from their jobs. On the other hand, without intensive long-term help, patients might be unable to do those jobs in the first place. Take Kathy Underwood, a second-grade teacher, whose September 2002 stroke left her unable to read or even speak. Today, after undergoing treatment at the University of Southern California that she calls "one-on-one hell," she's reading novels—and she's back to teaching others to read, too. Last September she returned to work half-time. This month she realized she could grade papers as quickly as she used to. No doubt her students have a lot to learn from her.

With Nadine Joseph in Los Angeles

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