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Startup designs robot that helps physical therapy

A Chicago startup has designed a robot to help people in physical rehabilitation recover more quickly from their injuries.

Time is a critical issue because the government and private insurers have cut their financial support for such therapy.

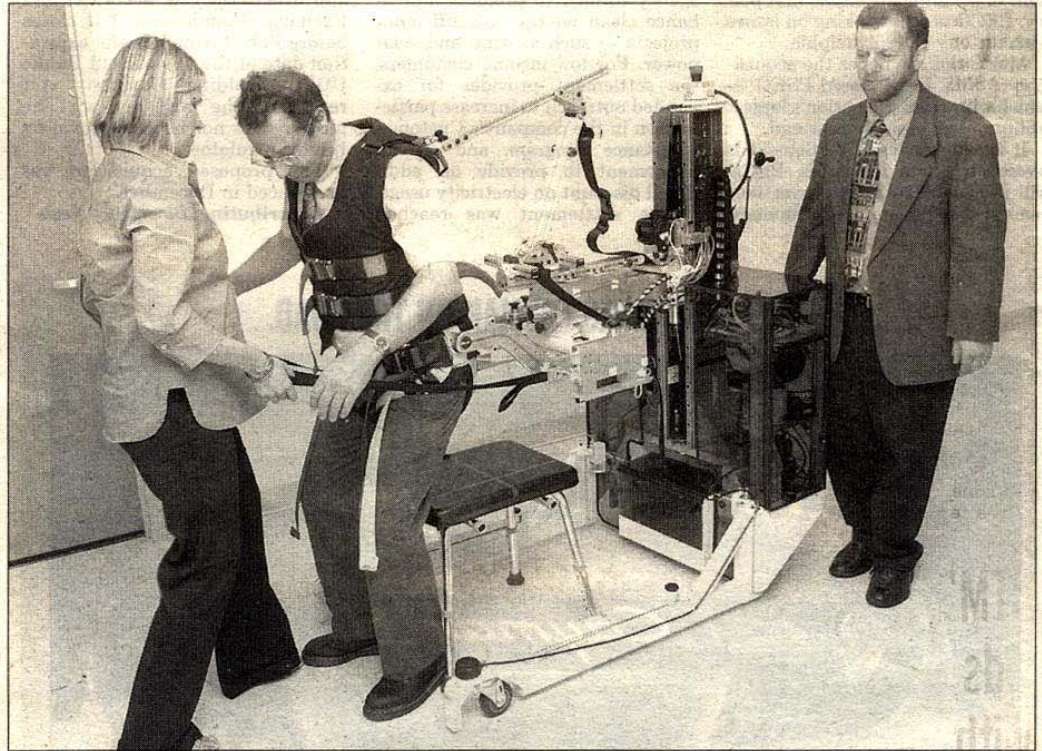
Two professors at Northwestern University who developed robots to help auto assembly-line workers, figured they could apply similar technology to physical rehab.

Edward Colgate and Michael Peshkin, who teach robotics, developed the auto-assembly-line robots by doing research funded by Ford and General Motors. They sold their auto-assembly robotics company, Cobotics, when the business outgrew their ability to market it. Stanley, a Cleveland-based company best known for its hardware and tools, bought Cobotics for an undisclosed price in December 2002.

Colgate, 42, and Peshkin, 47, recruited David Brown, 46, a physical therapist and an assistant professor of physical therapy at Northwestern's Feinberg School of Medicine, to help develop a robot that could help patients without overtaking the therapist's role.

The trio visited physical and occupational therapy clinics to ask therapists and clinicians what they would like a robot to do — and not do.

"We came up with the idea of a



Ela Lewis helps Chicago PT co-founder David A. Brown demonstrate how the company's robot helps people work on their therapy without fear of falling. At right is co-founder Michael Peshkin. —JEAN LACHAT/SUN-TIMES

walking and balance-training device," Brown said, and the trio formed the company, Chicago PT, in Evanston, to build the robots.

The beauty of the robot is its ability to catch a person undergoing physical rehabilitation before he or she falls, yet give him enough freedom to make progress, Brown said.

The patient straps himself into the robot as a sort of skeletal frame. The robot's main frame, or buggy, is wired with sensors that send feedback to the machine's wheels. Based on that feedback, the wheels' velocity and direction adjust to let the person move freely.

The robot's harness can catch the person's fall, and help lift the person's weight.

A torso mechanism, which attaches to the chest and back, allows the patient to reach up, forward or sideways, or it can be made rigid to ensure that the patient stands up-

right.

"The patient can walk around, and try sophisticated balancing and walking tasks with the aid of a helper," Brown said.

The robot's software allows it to be programmed for a variety of applications, such as when a person wants to kneel, reach forward or move as quickly as possible. Initial tests show that people harnessed to the robot try tasks they would have avoided by themselves because they were afraid they'd fall, Brown said.

Physical therapists can freely help the patient without having to spend time keeping the patient from falling, Brown said.

"Our early indication is that the robot is an enabling device, letting the patient try moving in ways they know will help them, but were afraid to try before," he said.

Brown credited Ela Lewis, a physical therapist who is the com-

pany's clinical project manager, with making sure the robot worked to the therapist's advantage.

Others instrumental in developing the robot are Julio Santos, director of engineering, and Alex Makhlin, the controls engineer for Chicago PT.

The robot is going through its motions at the Rehabilitation Institute of Chicago, which invested \$350,000 in the startup company.

The professors, who won an initial grant of \$1.5 million from the National Institute of Science and Technology, are seeking new grants to finance more research and clinical trials. They want to set up a clinic at the institute so patients can try new types of rehabilitation with the robot.

Eventually, the professors hope to send robots to other rehabilitation centers and produce the robot as a commercial device.