

# FAU portable robot mimics motions of physical therapists

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Florida Atlantic University researchers have developed a portable robot they believe can supplement face-to-face contact with a physical therapist, reducing medical costs and making it easier for patients to do exercises at home.

The device, for which FAU has filed a provisional patent, does not resemble most people's idea of a robot - it's no C-3PO - but it uses computerized robotics to mimic motions used in physical therapy for injured patients or those who have suffered a stroke or have cerebral palsy.

The robot was presented last week in Melbourne at the Florida Conference on Recent Advances in Robotics.

"It takes a lot of time for a physical therapist to lead you through a specific motion, and it's very repetitive for the therapist," said FAU mechanical engineering Professor Oren Masory, who worked with graduate student Melissa Morris on the design and construction of the robot. "The idea was to create a machine that could produce those same tedious motions."

The robot works by having a patient hold onto a joystick that sits on top of a glass surface but is attached with a magnet to a computerized pulley system under the glass.

The pulleys take the patient through a series of routine motions that a therapist can program into the computer.

As the patient gets stronger, precise resistance measurements can be added to the pulley system through the computer so the motion will require an increasing amount of muscle. The robot also will track a patient's progress and deliver the results electronically to a therapist.

The wood-and-glass prototype for the physical therapy device is primitive compared with what Morris and Masory imagine it can be if picked up by a medical equipment company or investment group for development.

But Masory said even a more advanced model shouldn't cost more than \$3,000 to create - a key element in what makes the product marketable.

Current robotic systems for physical therapy are so expensive that most clinics cannot afford them, said Karen McCain, a physical therapist and assistant professor at the University of Texas Southwestern Medical Center.

"No one has figured out how to move the robotics into the clinics where patients can use them, and that's clearly what these folks are interested in," said McCain, a member of the Alexandria, Va.-based American Physical Therapy Association. "You have to applaud them for that."

Masory envisions the robot as something patients can rent and take home, and that can be retrofitted to suit their specific needs. Though the current device is positioned horizontally, it also can be hung on the wall to work different upper-body muscles.

Mechanical engineering students this year will work on a similar physical therapy robot for leg muscles.

One concern McCain has is whether the robot will be able to maintain a patient's interest, which is one of the reasons Nintendo's Wii video games have become popular physical therapy devices.

But she said she has high hopes for FAU's robot.

"I'm a fan of this sort of stuff and would love to see it used clinically, instead of just in research," McCain said.