



DR. SHELLY LEVY-TZEDEK

DEVELOPING ROBOTICS, RESEARCH AND REHABILITATION

The ABC Robotics Initiative has expanded to encompass innovative and multidisciplinary research that strives to improve physical therapy rehabilitation. Dr. Shelly Levy-Tzedek of the Department of Physical Therapy, together with scientists from Industrial Engineering and Management, has developed a robotic system to enhance at-home therapy exercises.

Previous research has shown that keeping the patient engaged and motivated while performing repetitive exercises plays an important role in recovery. In recent years, robotic devices have become more common and are increasingly being used for physical therapy. Existing robotic systems, however, do not allow for unrestricted three-dimensional movement nor do they enable patients to fully practice the functions necessary to regain independence.

In order to overcome these shortcomings, the researchers, who are engaged in collaboration with colleagues in the US, Canada, and Europe, have developed a set of robotic rehabilitation games that encourage patients to perform functional movements without imposing restrictions on motion. The system incorporates a three-dimensional robotic arm and motivates the users to perform functional tasks such as reaching and grasping. Additionally, because users' movements and progress are tracked during the game, the system can provide physical therapists and physicians with accurate feedback regarding the patients' progress at home.

The innovative system is designed not only to promote research in the field of physical therapy but also to overcome the shortage of physical therapists in Israel and abroad. As a result of this shortage, many patients do not receive a sufficient number of therapy hours; consequently, they struggle to regain full physical functionality. It is anticipated that a home robotic system could supplement existing physical therapy at the clinic and offer patients a quicker and more complete recovery.

The researchers hope that in the future, every patient will have access to such robotic home physical therapy systems through non-profits like Israel's Yad Sarah Organization, whose services include a rehabilitative equipment loan program.

After work hours, Levy-Tzedek and her students remain in the lab working on an arts project, developing the robotic arm's artistic style – somewhere between the artists Jackson Pollock and Wassily Kandinsky!

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