Stroke recovery goes 3-D: Canadian video game takes rehab to the next level

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An innovative use of virtual reality is emerging as a major technique in brain recovery for stroke patients, Dr. Mindy Levin told the Canadian Stroke Congress today.

"Our brains have an extraordinary plasticity which can limit the damage caused by some types of stroke," says Dr. Mindy Levin, professor in the School of Physical and Occupational Therapy at McGill University. "Together with Dr. Heidi Sviestrup from the Faculty of Health Sciences at the University of Ottawa, our rehab program taps into the power of plasticity to gain the best recovery of movement of the arm by increasing a patients' motivation to continue with the long repetitive training tasks needed to restructure their brains."

Her team's interactive virtual reality training program boosts patients' confidence and increases the success of arm and hand rehabilitation by having them practice movements as part of a video game.

This enriched environment stimulates the brain to make the fullest use of its ability to re-organize and restructure itself after a stroke.

"Relearning and improving movements affected by brain injuries is an intense process that requires hard work and motivation," says Heart and Stroke Foundation spokesperson Dr. Michael Hill. "Research into how to best engage and motivate patients is vital for stroke recovery."

Sixty patients in Montreal and Ottawa are participating in the clinical

trial funded by the Heart and Stroke Foundation to establish the optimum conditions for stroke recovery.

There are many different types of virtual reality systems on the market. We are trying to discover which aspects of the virtual reality experience are of the most importance to rehabilitation. Patients in the study fall into one of four groups, explains Dr. Levin. Group 1 is treated with a fully immersive and interactive 3D virtual reality system; Group 2 interacts with a more economical 2D game system; Groups 3 and 4 practice similar games in different physical environments.

"The training program uses kinematics, which measures how well a movement is made," explains Dr. Levin. "It allows us to understand how recovery is happening."

Rehab patients play a reaching and catching game where they get a point for catching something with their hand. If they do it well, they get positive feedback from the game system and a higher score in the game. If they cheat, they don't get the point or any other form of reinforcement, says Dr. Levin.

"These techniques help patients work harder and longer," she says. "They get out there and really sweat and that's what you need for recovery."

So which version produced the maximum amount of motivation?

Dr. Levin says the results are very preliminary but, so far, it looks as if the 3D virtual reality system has a slight edge on the competition. It may be that people feel more 'present' or engaged in this environment, much like reality-based interactive video games.

"Novel use of virtual reality has the potential to revolutionize forever the

way we think about rehabilitation," says Canadian Stroke Network spokesperson Dr. Antoine Hakim. "Dr. Levin's research is showing that by motivating and involving the user, the recovery can be dramatic."

Dr. Levin's research was presented at the Canadian Stroke Congress 2010, co-hosted by the Canadian Stroke Network, the Canadian Stroke Consortium, and the Heart and Stroke Foundation.

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