

# Portable virtual reality rehab for stroke victims

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A portable virtual reality device improves neuroplasticity for quicker recovery. It is conquering hospitals around the world. It is being validated by the CHUV hospital in Lausanne, Switzerland and soon by the Stanford Stroke Center in the United States.

The Mindmaze platform, developed by a spin-off of the EPFL, Laboratory of Cognitive Neuroscience, is the first to enable the rehabilitation and personalized tracking of people affected by a stroke through fun and stimulating virtual reality exercises. The patient can practice alone, pause to recover, and resume as many times as necessary. It is now possible to maximize hours of training per day to ensure a better recovery. The device, named MindPlayPRO, also allows clinicians and caregivers to effectively handle several patients simultaneously. The start-up is set to receive a second Business Angels investment of half a million Swiss francs after the 2.7 million collected in 2012. It is also poised to complete a major round of financing.

Placed at the patient's bedside, the MindPlayPRO system has two screens on articulated arms. Caregivers can program the machine and obtain data from a high-resolution camera and track patient progress. The patient screen shows the 3D avatar of the patient with an exercise to perform – for example, to hit a target at the middle of a colored circle. The accuracy required can be adapted according to the patient's specific challenges. Just as with video games, successfully completing a task wins points. New cognitive exercises are being developed, which increase the gameplay along with the sophistication of training. The results allow

both the medical team and the patient to track progress and adjust tasks accordingly.

Repetition and diversity are equally important because this is about genuine relearning. The mastery of a specific motion does not ensure that all gestures will be easy. After being tested tested at CHUV (University Hospital of Lausanne) for two years, the device is now being introduced into the market. At the end of October, Tej Tadi, the founder and head of MindMaze has started a collaboration with the Stanford Stroke Center, one of the world's major research centers in this field, where a device should soon be deployed. Collaboration between that institution and the Swiss start-up is expected to strengthen early next year.

For disabled patients, one function of the device allows work by making the brain believe that the immobilized body part is still working. This enables early reactivation of neuronal connections. It is based on a simple principle. Observing the intended action is sufficient to gradually reactivate certain areas of the brain close to those that have been affected. For example, when the patient moves his good right arm, the computer shows his (motionless) left arm in the process of performing the same movement. This activates a region of the cortex closely related to what was damaged – which gradually takes over. Exercising is then facilitated with the disabled limb.

Every year 16,000 people in Switzerland and 15 million people worldwide are victims of a stroke. "We started by proposing a device that targets the rehabilitation of the upper extremity, because it is seriously debilitating for 75% of stroke patients," says Tej Tadi, who developed this technology during his doctoral studies.

Provided by Ecole Polytechnique Federale de Lausanne

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