Dextrain - Transforming neuro-rehabilitation of post-stroke patients

A French start-up launches an innovative medical device to help patients recover manual dexterity after stroke

Paris – June 3rd, 2021 – Dextrain announces the launch of the Dextrain Manipulandum, a medical device aimed to improve the independence and quality of life for many stroke survivors. This innovation is the result of a research program conducted at the Institute of Psychiatry and Neurosciences of Paris (Inserm U1266, Université de Paris).

The Dextrain Manipulandum, a medical device which obtained CE certification in June 2021, combines high-precision finger force recordings with specific neuroscience-inspired exercises, allowing an unprecedented characterization of manual dexterity. This novel technology was constructed to improve care of stroke survivors suffering from impaired manual dexterity.

In France, 140,000 people suffer a stroke each year¹ and more than 500,000 adults in France live with lasting symptoms including reduced capacity for upper limb movements. Stroke is the leading cause of disability in adults². Up to 50% of stroke survivors suffer from impaired hand and finger movements making daily tasks, like dressing and feeding, difficult or impossible³. This limits independence in daily life and negatively impacts quality of life.

Many other neurological disorders also lead to impaired manual dexterity, for example, multiple sclerosis, acquired brain injury or Parkinson’s disease. Recent advances in rehabilitation technology, such as robots or virtual reality set-ups, principally target arm and shoulder movements. Tools for training of finger movements and manual dexterity are lacking. The Dextrain Manipulandum was developed to provide patients access to manual dexterity neurorehabilitation and to maximize neuro-recovery and brain plasticity.
A collaborative innovation for autonomy

Dextrain technology is a result of over 15 years of clinical experience and neuroscience research. Pâvel Lindberg at Inserm, Maxime Térémetz at Université de Paris and Mathieu Boucher at Sensix (a company specialized in force sensors) conceptualized the first prototype in 2013 and performed a number of initial research investigations in neurologic and psychiatric disorders. The project was supported by the University valorisation facility (SATT - Erganeo). The team then joined forces with ARCHOS, a French expert in industrialization of mobile solutions, to form the medtech company Dextrain.

“We are pleased with this first co-creation with ARCHOS of a very promising startup in the medical device sector. The Erganeo - ARCHOS partnership is an ideal association between a player in technology transfer and a confirmed industrialist enabling access to the market for these technologies”, underlines Suat Topsu, Executive Chairman of Erganeo.

The participation of ARCHOS provides unique expertise in industrialization, marketing and sales in order to reach the market quickly.

“We are very excited with the medical device and tablet solutions developed by Dextrain. I believe these solutions will revolutionize dexterity diagnostics and rehabilitation in medical practice but also contribute to maintaining autonomy and well-being in the aging population”, Loïc Poirier, CEO, Dextrain

The same tool for assessment and rehabilitation

For patients, the Dextrain Manipulandum facilitates access to a more motivating and effective rehabilitation, through personalized exercises. For their part, clinicians will now be able to measure dexterity deficits and to rehabilitate the functions of the hand with the same tool.

Concretely, the Dextrain Manipulandum comprises five-finger pistons each linked to a sensor permitting to measure force exerted by the fingers. The force recordings are used in training programs running on a PC or tablet. Five exercises were developed to specifically evaluate the patient’s capacity in key aspects of dexterity including ability to control force, timing of movements, perform and memorize motor sequences and independent of finger movements. The Dextrain Manipulandum is the only solution allowing an objective and multidimensional assessment of dexterity with a single tool.

Clinical research studies have been conducted in neurological and psychiatric patients. This scientific work has resulted in several publications which have provided new information on dexterity disorders in stroke. The results highlighted the slow and sub-optimal recovery of independent finger movements in stroke, which is crucial in everyday tasks, from writing to mobile phone use or buttoning a shirt.

The Dextrain Manipulandum is a medical device enabling specific finger training with the aim to regain finger movements and return to daily tasks.
Personalized trainings for each patient

“The major advantage of the Dextrain Manipulandum is that it provides a comprehensive sensitive evaluation of dexterity and also makes possible targeted training of dexterity focused on each individual’s impairment in intense and motivating exercises”, Pável Lindberg, co-inventor and president of scientific committee of Dextrain. These interactive exercises keep patients and family members informed and engaged throughout the therapy.

“The patients really appreciate being able to perform fine finger movement training with feedback and being able to set-up training protocols that suit their needs”, Maxime Térémetz, Chief Scientific Officer, Dextrain.

The Dextrain Manipulandum is complemented by a tablet-based application for screening of dexterity impairments and to enhance accessibility to training in a variety of settings from the clinic to the home setting. The key here is to offer continued care thus maximizing recovery potential. The patient performs the exercises by placing their fingers directly on the screen. “The exercises offered by this digital solution focus on the precision, timing and variability of fine finger movements,” says Pável Lindberg.

Neurology: new perspectives for early detection

The rapid screening of dexterity impairments also opens the door for use in early detection of neurological impairments in progressive disorders such as neurodegenerative disorders (Alzheimer’s disease, Parkinson’s disease) or neurodevelopmental disorders such as schizophrenia. Ongoing research is looking at how early dexterity profiling, combined with machine learning analysis, can assist in prediction and prevention of disease development.

About Dextrain
Created in February 2021, the Dextrain company is specialized in the development and commercialization of innovative medical devices and digital solutions for the assessment and rehabilitation of manual dexterity. Its mission is to transform neuro-rehabilitation, by exploiting the latest advances in neuroscience, to provide a new generation of solutions in all pathologies impacting manual dexterity. The ambition is to improve the independence and quality of life of as many people as possible.

For more information: www.dextrain.com

References

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