Robotic arm may help to rehabilitate chronic stroke victims, finds new study

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New research published in *Frontiers in Neurology* finds that robotic arm rehabilitation in chronic stroke patients with aphasia, the loss of ability to understand or express speech, may promote speech and language function recovery.

Robotic arm rehabilitation is a commonly-used intervention for treating impaired motor function in the arm, wrist, or shoulder subsequent to stroke. The robotic arm rehabilitation in this study targeted the right arm, as the participants had each suffered a left hemisphere stroke leading to a deficit in motor function on their right side. Individuals with left hemisphere strokes affecting motor function are also likely to have deficits in speech and language processing, and the present study investigated whether those individuals may improve in their speech and language performance following treatment aimed at the domain of motor function. The research team observed small but consistent improvement on measures assessing speech articulation and overall language processing in aphasia.

This research was led Adam Buchwald, Associate Professor of Communicative Sciences and Disorders at NYU Steinhardt's School of Culture, Education, and Human Development, as well as Carolyn Falconer-Horne, a recent Ph.D. graduate of the department.

"While this is an initial finding that should be interpreted cautiously, it remains exciting to consider the possibility that stroke rehabilitation in one domain would improve performance in another domain, said

Buchwald. "It remains possible that some treatment approaches encourage plasticity and reorganization that can span multiple domains, most likely those with similar neural substrates. Further testing of these combined effects could lead to breakthroughs in our approach to stroke rehabilitation for individuals with complex deficits affecting mobility, speech and language processing, and other cognitive domains."

The research team was assembled following an initial observation by Weill Cornell Medicine's Dylan Edwards, Ph.D., P.T., that participants may be speaking better following 12 weeks of robotic arm treatment. Falconer-Horne, along with Buchwald and Edwards, designed a battery to evaluate possible changes in participant performance that formed the basis of the analyses in this paper.

More information: Adam Buchwald et al, Robotic Arm Rehabilitation in Chronic Stroke Patients With Aphasia May Promote Speech and Language Recovery (but Effect Is Not Enhanced by Supplementary tDCS), *Frontiers in Neurology* (2018). DOI: 10.3389/fneur.2018.00853

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