MOTOR LATERALIZATION PREDICTS HEMISPHERE SPECIFIC DEFICITS IN CONTRALESIONAL, IPSILESIONAL AND BIMANUAL MOVEMENTS IN STROKE.

Featuring Dr. Robert Sainburg
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ABSTRACT
We have developed a model of motor lateralization that predicts hemisphere specific motor deficits in stroke. According to this model, the left hemisphere is specialized for predictive control of limb dynamics that can specify smooth efficient movements, while the right hemisphere is specialized for impedance control that is robust to unanticipated perturbations during movement and posture. Non-paretic (ipsilesional) arm motor deficits in stroke depend on which hemisphere is damaged and on the severity of contralesional arm impairment. Thus, stroke survivors with the most severe paretic arm impairments have the greatest deficits in non-paretic arm coordination, contributing substantially to deficits in functional independence. Unfortunately, LHD patients with even mild impairment show specific deficits in bilateral coordination, emphasizing the lesion specificity of bilateral coordination. Taken together, our findings indicate that stroke patients should be assessed for both paretic and non-paretic arm motor deficits. Preliminary findings from a pilot intervention study indicate that remediation of non-paretic arm motor deficits can substantially improve functional independence.

ABOUT DR. SAINBURG
Dr. Sainburg is Professor of Neurology and Kinesiology at Penn State University. He completed his BS in Occupational Therapy at NYU, his graduate work (MS, PhD) in Neurobiology at Rutgers University, followed by Post-Doctoral Research under the mentorship of Dr. Claude Ghez at Columbia University. His research focuses on resolving the neural mechanisms responsible for control and coordination of voluntary movements. His research has explored the roles of proprioception and vision in control of limb dynamics including both coordination of multisegmental dynamics as well as regulation of limb impedance. His work has focused on lateralization of these mechanisms across the two hemispheres, and how this leads to hemisphere specific motor deficits in patients with stroke.