

Global Summit on Stroke

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Functional improvement in stroke patients in the subacute stage after treatment with whole-hand electrical stimulation

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Introduction: The present study examines the effect of whole-hand electrical stimulation on motor recovery in stroke patients at the subacute stage. Peripheral electrical stimulation has been proved to modulate cortical plasticity in healthy and in patients. Such neuromodulatory effects have been also found after application of electrical hand mesh-glove stimulation (MGS) in our previous studies on healthy subjects.

Materials & Methods: Patients with cortico-subcortical ischemic stroke and predominantly motor hemiparesis of the upper extremity were recruited for the study. MGS was applied on the paretic hand daily for 60 min before the standard rehabilitation training over three weeks. The hand motor and sensory functions were evaluated with Wolf Motor Function Test, Fugl-Meyer Assessment score, Nine Hole Peg Test and Semmes-Weinstein monofilaments. Single and paired-pulse transcranial magnetic stimulation (TMS) was applied to follow the corticospinal excitability changes over the treatment period. Further, functional magnetic resonance imaging (fMRI) was conducted to assess the cortical brain reorganization changes after the treatment. Effects of MGS were compared to control group receiving sham stimulation.

Results: Patients from both groups showed significant functional improvement as assessed with the motor functional tests. However the improvement degree for the MGS group was increased compared to the control group. These functional effects correlated with neuroplastic changes within the sensorimotor area as revealed by TMS and fMRI.

Discussion: Electrical stimulation applied before a physiotherapeutic training raise the motor cortical excitability in the lesioned cortex so that the subsequent training becomes more effective. The obtained results provide better understanding how modulation of central motor controlling structures by somatosensory stimulation correlates with the functional motor recovery.

Biography

Stefan Golaszewski worked as a Neurologist at the University Innsbruck from 1995 to 2001, where he focused on clinical applications for functional Magnetic Resonance Imaging. From 2001 to 2002, he has worked at the Medical University. He has worked as Associate Professor at the Department of Neurology at the Paracelsus Medical University (PMU) Salzburg in Austria since 2005 and focuses on the investigation of cortical reorganization after stroke. Since 2010, he is Medical Head of the Neuroscience Institute of the PMU. He has published 120 papers in international peer-reviewed journals.

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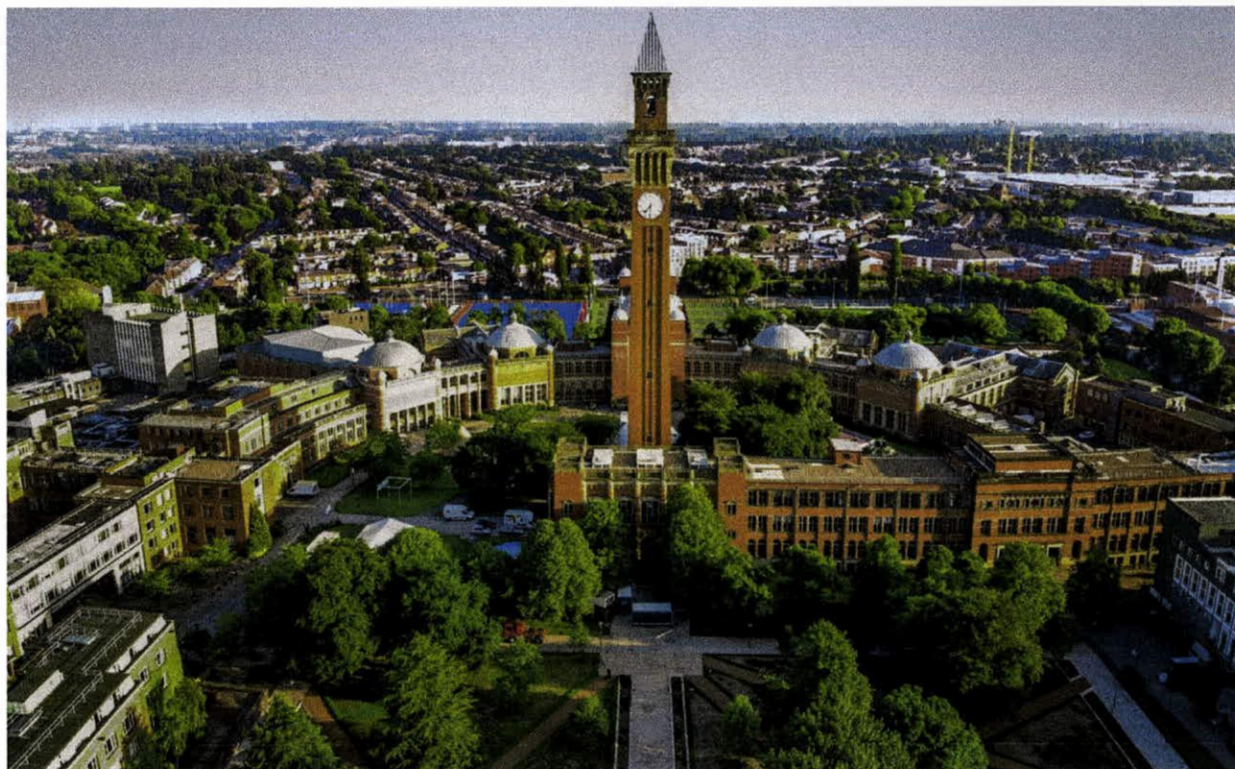
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