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Presentation Abstract

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Presentation Title:	Closed-loop brain-machine-body interface for noninvasive rehabilitation of movement disorders
Location:	WCC Hall A-C
Presentation time:	Wednesday, Nov 19, 2014, 8:00 AM -12:00 PM
Presenter at Poster:	Wed, Nov. 19, 2014, 9:00 AM - 10:00 AM
Topic:	++D.18.e. Neuroprosthetics: Other motor sensory interfaces (e.g., artificial vision)
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Abstract:	Traditional approaches for neurological rehabilitation of patients affected with movement disorders, such as Parkinson's disease (PD), dystonia, and essential tremor (ET) consist mainly of oral medication, physical therapy, and botulinum toxin injections. Recently, the more invasive method of deep brain stimulation (DBS) showed significant improvement of the physical symptoms associated with these disorders. The recent adoption of feedback control theory helped DBS protocols to take into account the dynamic nature of these neurological movement disorders that had largely been ignored so far. As a result, a more efficient and effective management of PD cardinal symptoms has emerged. Here we present a novel, transformative, noninvasive, and adaptive closed-loop framework for

rehabilitation of PD patients, based on mobile brain/body imaging (MoBI) with wearable sensors, control theory, and force neurofeedback. We also outline several future developments of closed-loop systems for the neurological rehabilitation of movement disorders that might bring us closer to individualized therapeutic solutions.

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Keyword (s): BRAIN-MACHINE-BODY INTERFACE

MOVEMENT DISORDERS

REHABILITATION

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