

Online and offline modulation of sensorimotor components following focal vibration

V. Bulgakova¹, N. Smetanin¹, K. Volkova¹, V. Pyatin², M. Feurra³ and A. Ossadtchi^{1,3}

1. Center for bioelectric interfaces, National Research University, Higher School of Economics, Moscow, Russia

2. Samara State Medical University, Samara, Russia

3. Centre for Cognition and Decision Making, National Research University, Higher School of Economics, Moscow, Russia

In the last decades, vibration stimulation is employed for treatment of various neuromotor disorders (e.g. spasticity, co-contraction, Parkinson's disease). However the underlying neural mechanisms of the observed beneficial effects remain largely unknown. Here we assess the effects of right hand vibration stimulation on the ongoing EEG activity in 11 healthy subjects. Vibration is implemented via a handgrip connected to a Power Plate personal platform (35 Hz, 31 m/s², 60s). Our results suggest that vibration of the hand area is accompanied by: 1) a significant bilateral desynchronization in the alpha and beta bands and 2) a significant contralateral desynchronization in the high-beta band (Wilcoxon, $p < 0.05$). Additionally, in the resting state condition, following vibration we observed a significant high-beta band synchronization (Wilcoxon, $p < 0.01$). These findings suggest differential functional significance of alpha, beta, and high-beta components of the sensorimotor rhythms and highlight potential mechanisms underlying clinical effects of vibratory intervention.

