(21-30Hz) beta frequency bands at the sensorimotor cortical region both sides using a beamformer algorithm called the Dynamic Imaging of Coherent Sources. We used repeated measures ANOVA to compare power values in the different locations and stimulation conditions in the two frequency bands.

Results: Resting state low- and high-frequency beta power in the primary sensorimotor cortex gradually decreased with the elevation of the ipsilateral stimulation level. In the continuously stimulated contralateral hemisphere, beta power remained at the baseline level. The beta power values measured in the two hemispheres were significantly different in stimulation levels 0-2 but not in level 3 ($p < 0.05$) both in the low- and high-frequency bands.

Conclusions: The change of beta power in the primary sensorimotor cortex during STN-DBS is strictly ipsilateral, and depends on the level of stimulation.

Beta power in the sensorimotor cortex could be a potential biomarker for closed-loop DBS.

Low and high beta band activity in the primary sensorimotor cortex is diminished by ipsilateral subthalamic stimulation in Parkinsonian patients

G. Tamas, A. Kelemen, B. Javor-Duray, M. Palotai, L. Halasz, L. Eross, G. Fekete, L. Bognar, G. Deuschl, M. Muthuraman (Budapest, Hungary)

Objective: We analyzed how change of the low and high beta power in the primary sensorimotor cortex relates to different levels of subthalamic stimulation; we hypothesized that it is a suitable biomarker for a closed-loop system.

Background: Beta power in the motor system is shown to indicate the kinetic state in Parkinson's disease.

Methods: We recruited 20 Parkinsonian patients. Bradykinesia of the most affected hand was measured first with Kinesia motion sensor system (Great Lakes NeuroTechnologies) in medication withdrawal; and four levels of contralateral stimulation (0: OFF, 1-3: decreasing symptoms to ON state) was individually selected. We performed 64-channel electroencephalography (EEG) measurement during a resting state with the four levels of stimulation settings mentioned above. We stimulated the usually used contacts during the whole study, and the ipsilateral stimulation remained ON and unchanged. The 2 minutes long EEG segments were cleaned from DBS artifacts by in-house algorithms. We performed line-noise removal; eye blinks and muscle artifacts were eliminated using ICA analyses. We calculated spectral power at the low (13-20Hz) and high