

## Resolving the networks of deep brain stimulation on high resolution EEG [Abstract]

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**P82****Resolving the networks of deep brain stimulation on high resolution EEG**

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The deep brain stimulation (DBS) of the subthalamic nucleus (STN) is the most effective surgical therapy for Parkinson's disease (PD). Firstly, the most reliable tool used to locate the electrode has been the MRI. However, the image distortion caused by the local magnetic field inhomogeneity of electrodes could be a concern for the accuracy of the MR images in estimation of the electrode position. In order to avoid this, recently there have been other tools used in combination like CT and MRI to locate the electrodes. Secondly, the network connected to the STN is well studied in both rodents and primates. In humans there have been few studies using diffusion tensor imaging (DTI) studying the cortical and sub-cortical connections of human STN. In order to solve both these questions we use dynamic imaging of coherent sources (DICS) which uses a beam forming approach to identify the voxel with the highest power in the brain for a specific frequency band. The first aim of the study was to locate the STN-DBS electrode by applying source analysis on high resolution EEG. Secondly, to identify tremor related areas which are associated with the STN. The Dynamic imaging of coherent sources (DICS) was used to find the coherent sources in the brain. The capability of the source analysis to detect deep sources like STN in the brain using EEG data was tested. In all the 5 DBS treated Parkinsonian tremor patients the power spectrum showed a clear peak at the stimulated frequency and followed by

their harmonics. The DBS stimulated frequency constituted a network of primary sensory motor cortex, supplementary motor area, prefrontal cortex, diencephalon, cerebellum and brainstem. Thus the STN was located in the region of the diencephalon. The resolved network may give better understanding to the pathophysiology of the effected tremor network in PD patients with STN-DBS.

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