Developing an EEG-based approach to DBS-frequency modulation in Parkinson's disease (DEEP-FREP)

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Trial Design/Class:	monocenter, proof-of-concept study
Number of Patient:	20 participants
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Summary:

There is a large body of evidence showing increased oscillations and synchrony of cortico-subcortical neuronal circuitries within the beta frequency range in Parkinson's disease (PD). These electrophysiological abnormalities correlate well with motor impairment such as akinesia.
On the other hand, physiological oscillations within the gamma frequency range occurring around voluntary movements are attenuated in patients with PD. Despite the knowledge about the role of pathological neuronal oscillations, frequency modulation in deep brain stimulation (DBS) has been investigated insufficiently.
First studies indicate that there are individual differences regarding the DBS frequency associated with the best treatment response.

In this proof-of-concept study we aim at developing an EEG-based approach which predicts the individual DBS frequency with the best motor response for each patient. Surface EEG data recorded from 20 PD patients with chronic STN-DBS will be analysed regarding peak frequencies within the beta and gamma frequency range, treatment and movement-related shifts of these peak frequencies as well as cortico-cortical coherence between motor cortices within the above-mentioned frequency bands to predict the individual 'optimal' frequency. The attractiveness of our approach for clinical routine would consist of the ease to predict the 'optimal' DBS frequency by recording a standard EEG without iteratively testing all possible DBS frequencies.

Contact

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