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Obsessive-Compulsive Disorder: Development of Demand-Controlled Deep Brain Stimulation with Methods from Stochastic Phase Resetting

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Abstract : Synchronization of neuronal firing is a hallmark of several neurological diseases. Recently, stimulation techniques have been developed which make it possible to desynchronize oscillatory neuronal activity in a mild and effective way, without suppressing the neurons' firing. As yet, these techniques are being used to establish demand-controlled deep brain stimulation (DBS) techniques for the therapy of movement disorders like severe Parkinson's disease or essential tremor. We here present a first conceptualization suggesting that the nucleus accumbens is a promising target for the standard, that is, permanent high-frequency, DBS in patients with severe and chronic obsessive-compulsive disorder (OCD). In addition, we explain how demand-controlled DBS techniques may be applied to the therapy of OCD in those cases that are refractory to behavioral therapies and pharmacological treatment.

Keywords : stereotactic neurosurgery, deep brain stimulation, obsessive-compulsive disorder, phase resetting
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