Neurofeedback

Neurofeedback (NFB), also called neurotherapy or neurobiofeedback, is a type of biofeedback that uses real-time displays of brain activity—most commonly electroencephalography (EEG)—in an attempt to teach self-regulation of brain function. Typically, sensors are placed on the scalp to measure electrical activity, with measurements displayed using video displays or sound. There is significant evidence supporting neurotherapy for generalized treatment of mental disorders

Parkinsonian motor symptoms are linked to pathologically increased beta-oscillations in the basal ganglia. While pharmacological treatment and deep brain stimulation (DBS) reduce these pathological oscillations concomitantly with improving motor performance, Bichsel et al. set out to explore neurofeedback as an endogenous modulatory method. They implemented real-time processing of pathological subthalamic beta oscillations through implanted DBS electrodes to provide deep brain electrical neurofeedback. Patients volitionally controlled ongoing beta-oscillatory activity by visual neurofeedback within minutes of training. During a single one-hour training session, the reduction of beta-oscillatory activity became gradually stronger and they observed improved motor performance. Lastly, endogenous control over deep brain activity was possible even after removing visual neurofeedback, suggesting that neurofeedback-acquired strategies were retained in the short term. Moreover, they observed motor improvement when the learned mental strategies were applied 2 days later without neurofeedback. Further training of deep brain neurofeedback might provide therapeutic benefits for Parkinson patients by improving symptom control using strategies optimized through neurofeedback ¹.

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Bichsel O, Stieglitz LH, Oertel MF, Baumann CR, Gassert R, Imbach LL. Deep brain electrical neurofeedback allows Parkinson patients to control pathological oscillations and quicken movements. Sci Rep. 2021 Apr 12;11(1):7973. doi: 10.1038/s41598-021-87031-2. PMID: 33846456.

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