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Simultaneous low-frequency deep brain stimulation of the substantia nigra pars reticulata and high-frequency stimulation of the subthalamic nucleus to treat levodopa unresponsive freezing of gait in Parkinson's disease: A pilot study

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We have read with interest the letter sent by Dr. Weiss et al. We appreciate very much their comment especially considering that his group was the first one publishing the possible beneficial effects of combined subthalamic and nigral stimulation to improve gait problems associated to Parkinson's disease [1]. In our study, indeed, we studied gait problems resistant to levodopa therapy or to any other pharmacological treatment.

We agree that there are no comparative data between low- and high-frequency SNr stimulation (neither SNr alone nor combined with STN) at the present moment. In fact the main reason for stimulating the substantia nigra pars reticulata at low frequency (63 Hz) in our study was that we believed that at this rate of stimulation the probability of inducing side effects would be lower considering the number of structures surrounding the nigra (oculomotor, sensitive, etc.) In addition we also tested this low frequency setting based on the previous published works showing beneficial effects on parkinsonian gait problems when stimulating at frequencies ranging from 60 to 80 Hz at the most ventral part of the subthalamic nucleus [2–6].

In fact, although in our study the lower stimulation contacts where located at substantia nigra pars reticulata we cannot rule out the possibility of certain effect at the ventral subthalamus. In most of patients we did not use the lower contact because of side effects, and consequently the volume of tissue activated could perfectly influence the ventral subthalamic nucleus. We are now thinking about the possibility of initiating a new study targeting the subthalamic nucleus using high frequency stimulation at the dorsal part of the nucleus and low frequency stimulation at the ventral areas.

We definitely agree with Dr. Weiss et al., that more detailed basic research and clinical work is needed to ascertain the role of nigral stimulation in the treatment of parkinsonian gait disorders.

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