

Systems and Methods for Deep Brain Stimulation Using Kinematic Feedback for Treatment of Movement Disorders

This technology offers the statistical analysis of gait parameters, a motor symptom of Parkinson's disease. This system conducts deep brain stimulation and adapts its response with the stimulation frequency varying between low (i.e. 60 Hz) and high (>130 Hz) frequencies to improve gait.

What is the Problem?

Freezing of gait (FOG) is a devastating motor symptom of Parkinson's disease that leads to falls, reduced mobility, injuries, and decreased quality of life. Reliably eliciting FOG has been difficult in the clinical setting, where there is limited documentation of the efficacy of treatments. Deep brain stimulation has been demonstrated to improve gait irregularity and freezing of gait. Specifically, there is growing evidence that lower frequency stimulation (e.g., 60 Hz) may be more therapeutic than higher frequencies (≥ 130 Hz), while higher frequencies may be more beneficial for other signs and symptoms such as rigidity or tremor. However, there is no way to adapt the frequency to respond to current conditions.

What is the Solution?

The solution is an algorithm that employs statistical analysis of gait parameters and/or FOG to adapt either intensity or frequency of the deep brain stimulation to improve gait. Once gait has been restored or the person is no longer walking, the system can switch back to prior frequency intensities. If variability in the gait is high, the system can adapt the stimulation frequency to a lower frequency (e.g., 60 Hz). Once the variability has decreased such that gait is more regular, the stimulation frequency can be switched back to a high frequency (≥ 130 Hz).

What Differentiates it from Solutions Available Today?

There is limited documentation of the efficacy of methods such as different frequencies of subthalamic deep brain stimulation (STN DBS). Current solutions in the deep brain stimulator space do not have the adaptability of responding to changes in gait. This adaptability will increase the effectiveness of the treatment. The competitive advantage is the algorithm that can change frequencies in response to changes in the gait.

Patent Information:

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Category

Selection of Available Technologies
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