Abstract Title: Non-Invasive Peripheral Nerve Stimulation for Symptomatic Relief of Hand Tremor in Essential Tremor

Press Release Title: Evidence Shows Non-invasive Nerve Stimulation May Help with Hand Tremor

Objective: We evaluated the safety and efficacy of a non-invasive neuromodulation therapy for hand tremors in essential tremor (ET) using a custom stimulation pattern tuned to interrupt each patient’s tremulous signal in both acute and at-home settings.

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Background: Although the precise mechanisms of ET are uncertain, it is thought to be caused by tremulous activity within a central tremor network. There is myriad clinical evidence supporting invasive neuromodulation of deep brain structures within this network in ET patients. Few studies have investigated the effect of non-invasive neuromodulation of the connecting peripheral nerve inputs to this network in tremor.

Design/Methods: In the acute study, 77 subjects were randomized to receive either peripheral nerve treatment or sham stimulation of the tremor dominant hand. Tremor was evaluated before and after a single stimulation session. For the chronic study, 61 subjects were randomized to treatment, sham, or standard-of-care. Subjects underwent a minimum of two sessions each day throughout the study.

Results: The acute study demonstrated that the therapy was safe and produced significant improvements compared to sham in the physician-rated Tremor Research Group Essential Tremor Rating Assessment Scale (TETRAS) dominant upper limb scores (p=0.017), and in patient-rated Bain & Findley activities of daily living (ADL) scores (p = 0.001). No significant adverse events were reported, 3% of subjects experienced mild adverse events (skin redness, irritation) that spontaneously resolved without intervention. In the chronic study, baseline tremor characteristics, including tremor frequency (5.3 Hz +/- 1.1 Hz), were identified in the kinematic data as well as tremor characteristics and response over the course of the study.

Conclusions: These randomized controlled studies suggest that non-invasive peripheral neuromodulation may offer meaningful symptomatic relief from hand tremor in ET with a favorable side effect profile compared to other available therapies, and that at-home monitoring may provide key insights into evaluating and treating tremor.

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