Tremor Alleviation for Neuromuscular Disorders Using a Weighted Vibrating Glove Prototype

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The symptom of neuromuscular tremors arises when large groups of neurons abnormally fire in unison. Using computer simulations, a team at Stanford discovered that a patterned stimulus that vibrates at a frequency of 100 to 300 hertz can desynchronize neuron firing to alleviate tremors. However, trials required patients to remain stationary for two hours, twice a day, while keeping their fingertips on vibrational motors. It is hypothesized that a weighted vibrotactile glove could make treatments portable, less restraining, and accessible. Keeping the gloves weighted will make them effective even when turned off, combining an innovative vibrational therapy with weighted gloves commonly used by people currently dealing with tremors. Using coin-button type mini motors, each vibrational mechanism was soldered to a positive and negative wire, before being encapsulated in heat shrink tubing to remain in place. Next, each pair of wiring was covered by braided sleeving and ran into a terminal block, which was then filled with glass beads to simulate a weighted glove. Then, wires were soldered and run through every other microcontroller port of an Arduino Nano Every circuit board, and then confined in a 3D-printed case. These wires were then run up to a terminal block, with each corresponding to a set of wires connected to a vibrational motor. The 3D-printed case was held onto a Velcro wrist strap, and finger cots were placed on top of the motors to simulate a glove. Then, an algorithm was created and uploaded to the board to allow for the correct vibrational frequency before being connected to a battery pack for a continuous power source.

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