A Robotics Assistive Device Application in Minimizing Manibus Tremors in Persons Afflicted with Bradykinesia: Phase V

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Research shows that approximately 10 million Americans have essential tremors. Of these 10 million, 4-5% begin tremors as young as 40 years old. There is also a 50% chance of a child inheriting the chance for mutations to develop in the SNCA gene. With this in mind, the design of this robotic arm limits the acceleration of the arm in order to dampen the effect of the patient's hand motion. Taking into consideration multiple designs over time. This design encompassed past years knowledge resulting in modifications towards developing an assistive device that limits the acceleration of the arm in order to dampen the effect of the patient's tremors. Safety concerns occurred and led to the redevelopment of the control glove using professionally manufactured boards and 3v LiPo batteries to maximize size and functionality. A new robotic 3D printed design granted stability and strength. The Arduino C++ program was used for board coding and troubleshooting. To limit robotic output of tremors data filters were used in coding. Correct variables were determined by a non afflicted patient's test scores. Stepper motors allowed for more accurate and effortless experience. 5mm gear belts were printed using flexible PLA in order to enhance cost effectiveness. Ultimately, the device improved hand performance by minimizing the transmission of paralysis in a safer way.

Awards Won:

Fourth Award of $500

University of Arizona: Renewal Tuition Scholarship