Upper Extremity Wearable Assistive Device

Team Members

- Katerina Gregoriou

Project Video

Video due and should be uploaded to your page by 6/5. See previous course pages for example videos.

Videos should be less than 7 minutes.

Background

Cerebral Palsy (CP) is the most common motor disorder in childhood, affecting over 17 million individuals worldwide (Cerebral Palsy Foundation). The majority of these individuals are unable to perform activities of daily living (ADL) due to wrist contracture, one of the most common symptoms of the spastic subtype of CP. As a result, these individuals are often forced to rely on a caregiver, stifling their independence. Furthermore, because a cure does not yet exist for CP, in order to improve their symptoms they often spend a significant part of their lives in physical or occupational therapy, in addition to trying various assistive devices which range from exoskeletons at $50-100k to rigid braces. The lifetime care cost for an individual with CP is over $1 million (Cerebral Palsy Foundation).

The overarching goal of this project—which extends beyond the work of ME 485—is to develop assistive clothing for individuals with movement disorders, first starting with CP. The two driving motivations are to 1) facilitate increased independence in individuals with movement disorders, and 2) to significantly decrease the financial barrier to treatment. The first prototypes draw therapeutic principles from literature on vibration therapy and Functional Electrical Stimulus (FES). Katusic et al. conclude that vibration therapy may reduce improve motor function and decrease spasticity. Furthermore, Wright and Granat's findings on FES on the wrist extensor muscles in children with CP showed increased wrist extension and increased overall hand function during treatment and at follow-up.

Research Question(s)

Methods

This can include:

- Model(s) used
- Simulation strategy
- Computational tools
- Experimental procedures/data
- Flow chart of methods

This will vary based on your project.

It should include a step-by-step guide such that anyone using your page can understand and complete. The purpose of the confluence page is to share your work with others so that we can build off of each other's research, so making your methods clear is very important.

You can also insert code (with approval from project mentors) and other helpful links.

To be completed by 6/5 (but you should have a plan by 5/8).

Results

This can include:

- Videos of simulations
- Graphs of results
- Tables of results
- Other figures
- Relevant equations

Make sure to point out how this addresses your research questions.

Limitations.

To be completed by 6/5.

Future Work

- What were some challenges you faced?
- Did you address all the research questions you aimed to?
- What future studies could be done to address these challenges?
- Based on your results, what are the next questions to be studied?
- How does this advance the field of biomechanics on a larger scale?

To be completed by 6/5.

Acknowledgements

You should acknowledge any help you received on your project. Collaboration is always encouraged but must be acknowledged.