Thesis Project Portfolio

Electroencephalogram Controlled Rehabilitative Exoskeleton

(Technical Report)

Increasing Influence of Exoskeleton on Physical Therapy

(STS Research Paper)

An Undergraduate Thesis

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Sociotechnical Synthesis

Studies point out the increasing prevalence of neuromuscular disorders across the world. Although physical therapy is available, the current process is extremely lengthy and expensive for most neuromuscular patients. Exoskeletons, or wearable robots, are gaining popularity as an independent, affordable rehabilitative technology. Exoskeleton is an evolving technology that neuromuscular disorder patients and physical therapists directly interact with, so research was conducted to evaluate the potential social impacts of exoskeletons before exoskeletons are widely utilized as a rehabilitative technology.

The main theory for this analysis is Actor-Network Theory, which is a way to view the world as a network full of changing relationships amongst multiple actors. *Program of Action* and *Delegation* are two components of the Actor-Network Theory relevant to the research. *Program of Action* states that instructions are inscribed to encourage certain behaviors. *Delegation* refers to assigning a technology to complete a manual task originally done by humans. One research method is thematic analysis of survey responses from current physical therapists. The survey provides background information and asks multiple linear scale and free response questions to gather qualitative and quantitative responses on potential impacts of exoskeletons on physical therapy procedures. Another research method is thematic analysis of a scientific journal that discusses current limitations and future effects of exoskeletons. Combination and comparison of outputs of the two research methods should provide pieces of evidence supporting the main argument that exoskeletons will increase influence on physical therapy and eventually become an essential physical therapy equipment as time passes.

Exoskeleton is such a powerful technology that its effects are beyond technical realms. As exoskeletons evolve into numerous forms and exert more influence on physical therapy

procedures, the usefulness of exoskeletons must be evaluated in advance by considering the potential technical and social effects of exoskeleton usage. By discussing this topic from both technical and STS perspectives, the result will provide valuable insights into the ways the evolution of exoskeletons influences the conventions of physical therapy in the future.