Rhythmic Mechanical Hippotherapy to Emulate Therapeutic Riding

Overview
Hippotherapy is a type of therapy involving horses which helps mentally and physically disabled patients improve their physical and mental wellbeing. The purpose of this project was to purchase a core muscle fitness machine and compare the movements of the machine to a live therapeutic horse. Additionally, an environment was designed to give the patients supplemental benefits while also creating a fun and enjoyable atmosphere.

Objectives
- Test the movements of a live horse with an accelerometer
- Test the movements of a simulator with an accelerometer
- Compare the movements of the live horse and the simulator and supply feedback
- Design an interactive and beneficial environment around the simulator

Approach
- Met with Dr. Sommer to discuss what he was looking for in our project and the overall deliverables
- Researched hippotherapy and the science behind patient improvement.
- Travelled to CATRA in Harrisburg, PA to test the movements of the live horse
- Determined the Panasonic Core Trainer was the machine that should be purchased due to the multiple axes of movement
- Designed and built a stretching machine with lights and buttons to be located around the simulator for patients to interact with
- Tested the movements of the Panasonic Core Trainer
- A Fast Fourier Transfer (FFT) was conducted on the data retrieved from the simulator and the horse along with a comparison of the maximum and minimum acceleration of each test in the x, y, and z-direction.
- Concluded using the data collected that the simulator does not mimic the movements of a horse; however the machine should be used in future research. This, in addition to previous research, concludes that the machine does still benefit patients, but in a different way.

Outcomes
- This project allows future researchers to be aware that the machine does not move like a horse, but holds similar physical benefits.
- An environment will be able to engage patients that are being studied, for further improvement.
- The sponsor will have saved $1100 dollars as a result of this project through the Learning factory budget and donations