Feeding Utensil Holder for User Without Fine Motor Control - Team B

Overview
Marty Kester has Charcot-Marie-Tooth disease, a degenerative nerve condition that has left him with limited fine motor control in his fingers and wrists, making everyday tasks such as eating, picking items up, or holding a credit card very challenging for him. This project focused on modifying the assistive eating device that Marty is currently using. While not too many changes needed to be made since Marty is generally satisfied with the overall function of his current device, there are several features that needed to be modified to improve how Marty eats meals each day.

Objectives
To create a device that will improve upon the current model that Marty is using to eat through each of the following design objectives:
- Incorporate an easier method of adjusting the angle of the utensil
- Increase the durability of the grip of the device on the utensil
- Make the device non-specific to Marty’s own utensils, for easier use outside his home

Approach
- We first met with our sponsors, Marty and Dr. Hills, to review the objectives of the project and to gather information about Marty's current device
- Together with our sponsors, we defined customer needs, such as ease of use, durability, & comfort
- We engaged in a concept generation process to discuss possible device ideas that could be used to achieve the design objectives, then analyzed the design concepts based on our customer needs
- We used SolidWorks to generate 3D models of our best design and SolidWorks Simulation to perform Finite Element Analysis on the models
- We submitted the models to the Learning Factory for 3D printing
- Based off of the prototype, we updated SolidWorks models and created new versions of the prototype several different times until we were satisfied with the functionality of our device
- We performed tests on our final design by taping each user's fingers together and having them use the device to eat several kinds of foods
- Users ranked the device on a scale of one to five in several categories, such as ease of utensil rotation or comfort during use

Outcomes
- The utensil is much easier to rotate than the previous device, and can now rotate in both directions
- The rotating of the utensil is more subtle, as the wheel rotating against the table is quiet and discreet
- The overall size of the device is small and can fit in the palm of Marty's hand
- The device utilized a new locking mechanism that involved an arm and spring to lock the utensil in place