CMTD Assistive Eating Utensil

Overview
Charcot-Marie-Tooth (CMT) disorder has rendered the client’s hands ineffective, making independent eating a daily challenge and burden. Current market products do not satisfy the client’s specific needs. The primary shortcoming of market products is a lack of rotational capability for utensils when mounted within the housing mechanism. Testing and evaluation was performed after several prototypes were produced.

Objectives
The team’s objective was to design a mechanism compatible with conventional silverware that offers a range of rotational motion, so as to facilitate the client’s independence while eating.

Approach
• Gathered customer needs from a core group of individuals and doctors familiar with the client and his condition
• Formulated a comprehensive list of client’s needs to guide the concept generation process
• Analyzed and generated several concepts for the feeding utensil such as magnetic locking mechanisms and gear driven rotary systems
• Developed and 3-D printed multiple prototypes based on magnetic locking mechanism concept
• Performed strength testing of the prototype, ensured its safety, and produced a product that meets all target specifications
• Performed testing with the client multiple times with three different prototypes using a standardized test plan
• Created a final product once the client was satisfied with the prototype development

Outcomes
• The final product consists of three easy-to-clean parts: an end-cap, a housing, and a utensil holster.
• The product consists of a cylindrical housing into which various cylindrical utensils slide and secure within 12 different angular orientations.
• The spoon utensils have been bent at a 30-degree angle to increase ease of use and reduce stress on the client's shoulder.
• A subtle pull-tab has been added near the top of the utensil to aid in utensil exchange and rotation, which achieves the desired utilitarian balance between structural rigidity and ease of operation.
• The client has tested the final prototype and reported positive feedback.