Robotic Arm Rest

Overview
Patients with Upper Limb Spasticity receive Botox injections to help relax the muscles and reduce pain associated with the constant contractions of their arm muscles. Physicians at the Penn State Hershey Rehabilitation Hospital need a device that enables them to efficiently give these injections to patients without the assistance of multiple physicians. The goal of this project is to create a universal device that will comfortably stabilize and support the patient’s outstretched arm.

Objectives
The main objectives were to create an adjustable elbow joint, wrist joint, and forearm length. In addition the device needed to be lightweight, portable and maintain a professional appearance.

Approach
- Gathered customer needs through conference calls with the physicians at the Penn State Hershey Rehabilitation Hospital
- Conducted a patent and existing products search
- Developed target specifications and related them to customer needs
- Brainstormed three main concepts for the device
- Used a Pugh Chart to determine the best design
- Created CAD models of the design
- Performed a Solidworks analysis on the design with the selected materials
- Built a preliminary prototype based on the CAD models
- Conducted a site visit with the sponsor and initial prototype to gain feedback
- Built the final prototype based on feedback
- Conducted testing for comfort, support and maneuverability using surveys and weights

Outcomes
- The sponsor will be able to administer Botox injections without assistance
- Patients’ arms will be comfortably and safely supported while they receive injections
- The sponsor will be able to use the device for patients’ with varying arms sizes and levels of Upper Limb Spasticity