Adaptive Recreational Equipment for Bilateral Amputees

Overview
Current prosthetic attachments that allow amputees to play recreational sports such as golf are not tailored to suit the needs of bilateral amputees. In addition, current devices on the market are made specifically for only a single sport. The project focused on designing a prosthetic attachment that allows for the amputee to use rods of various shapes such as golf clubs, fishing poles, and hand tools.

Objectives
Our team’s objective was to produce a prosthetic attachment that is low weight, has a small footprint, is easy to use for a bilateral amputee, and can hold a range of diameter cylindrical tools. Our factors that we had to consider was aesthetics and cost.

Approach
- Met with Diane Matter, our sponsor, and discussed the various problems with the previous device, the IronLion, and her hopes for our device
- Separately came up with different concepts based on her needs and discussed each one together as a group
- Utilized a screening matrix to find the most effective design (spring loaded wedge mechanism)
- Prototyped the chosen design, tested it, and ran analysis with it
- Revised the design (dual strap design), tested the device with Diane, and learned of possible issues
- Utilized force analysis on AutoCAD to understand how frictional forces are effected by points of contact on the golf club
- Revised the design by adding v-shaped supports to decrease rotational movement and provide stability
- Tested the design (to satisfactory results) with Diane at a golf clinic

Outcomes
- Produced device that costs $59.25 each in comparison to devices on market for hundreds of dollars
- Created device that allows bilateral amputees to play sports such as golfing or fishing as well as gardening
- The project reduced the bulkiness of the previous IronLion design and increased ease of use
- Manufactured a device that the amputee can put on and take off by themselves