**The Thumb Guys**

**Prosthetic Thumb**

Design, test, and manufacture individualized partial hand prosthesis, that is both user-friendly and comfortable, to accomplish client-requested tasks.

**Background:** Client retains portions of fingers on right hand, and his left arm and both feet are amputated.

**Design Process**

The circular ratchet with one-way bearing allows manual positioning of thumb without pushback from rigid objects and features a push-to-release tab. Molded silicone provides additional friction between the prosthetic thumb and wrist prosthesis to objects being held. Arm cuff disperses forces over a large surface area, foam padding mitigates possible pain associated with all-day wear. Boa system with custom dial utilizes simple pulling motion to securing prosthetic device to arm.

**Future Improvements**

- Decrease size of axle and surrounding components of racheting assembly to reduce overall weight of device and mitigate user fatigue.
- Optimize molded silicone design by changing parameters such as density, pattern, size, shape, and adhesize type to increase grip strength of the prosthetic thumb.
- Increase resolution of push-to-release button/tab to increase ease of use.

**Right hand prosthesis to complete everyday tasks, including:**
- carry a plate or bowl
- eat with a utensil
- hold a soda can
- push a manual wheelchair
- open a water or Gatorade bottle

**Client Testing First Prosthesis Prototype**

**Impact on Society**

Most functional prosthetic hand devices on the market cost around $10,000. This prosthesis is low-cost to manufacture (less than $100) and easily replicated with access to 3D printing. 3D printed prosthetic devices can improve amputees’ mobility and allow them to regain independence without being overly expensive.

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