

Touch of a Button!



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Team Members



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Overview Summary

- Introduction To Design Challenge / Background
- Existing Solutions
- Our Design Concepts and Ideas
- Future Design Considerations

Discussions with Gary Berke and Megan Zachar

◎ Biggest Difficulties when Dressing:

- Any dressing task that requires two dexterous hands is a difficult task for many.
 - Buttons

◎ Considerations

- Dressing Aids will be useful, if the devices require only one hand, or one hand and a simple prosthetic.
- Many of these devices need to be kept on the person at all times in case they need to redress throughout the day.

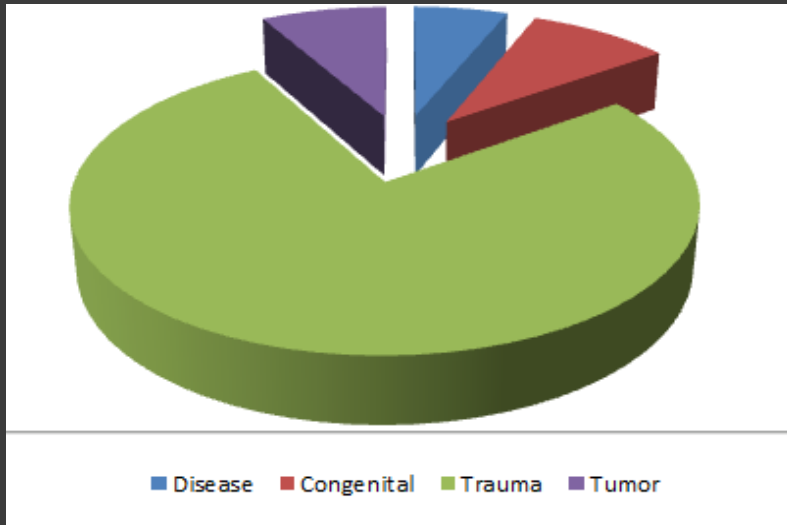


Design Challenge

- To design a buttoning dress aid for a person with a unilateral trans-radial amputation
- **Main Motivation:** To Increase the Person's **Independence**



Target Group



Who is our target group?

- ◎ Persons with unilateral trans-radial (below elbow) amputations.

Quick Statistics (U.S.)

- ◎ In the U.S., 41,000 persons reported upper-limb amputations.
- ◎ Projected increase to 131% by the year, 2050.
- ◎ Trauma is cause of 77% of upper-limb amputations.

Video Clip: Dressing

Video Analysis

- ⦿ Self-made device
- ⦿ Buttoned cuffs before putting on shirt
- ⦿ Difficult Areas: Cuff and Tight Top Button on Shirt Front



Description of Specific Problem

Design Buttoning Aids for:

- Shirt buttons
- Cuff buttons
- Jeans/Pants buttons

Button Differences and Difficulties

◎ Shirt Buttons

- Many

◎ Cuff Buttons

- Lack dominant hand to button

◎ Jeans/Pants Buttons

- Tension



Existing Shirt Button Aids

Advantages:

- Easy to hold
- Fast to button

Disadvantages:

- Wire easily twists and bends out of shape
- Wire is too large to go through many shirt buttons
- Cannot be used to button cuffs on dominant hand
- Bulky to carry around



“Magic” Button Aid for Jeans

Advantages:

- One handed
- Simple motion
- Flat to carry in pocket

Disadvantages:

- Too short to grab onto button
- Only useful for those with flat stomachs with low tension on pants and buttons that are able to come together by themselves



<http://www.youtube.com/watch?v=b3s2kmO2oLE>

Velcro and Adaptive Clothing

Advantages:

- Easy to use and to put on

Disadvantages:

- Requires specially made clothing (expensive with few selections) or to be sewed on to all other clothes
- Permanent addition to all clothing
- Very loud
- Can't hold if tension is too large
- Easily dirtied



Overall Disadvantages of Existing Aids

- ⦿ All tools must use dominant hand to operate
 - Useless for cuff buttons
- ⦿ All tools difficult to use for buttons that have tension across them
- ⦿ Very few tools with true portability

Design Concepts/Criteria for Button Aids

- ① **Function:** Must address issues of buttoning on the cuffs and jeans
- ① **Portability:** Must small and easily carried in pocket or on clothing itself
- ① **Aesthetics:** Must be hidden or aesthetically pleasing
- ① **Cost:** Cheap to Manufacture and Affordable for Users

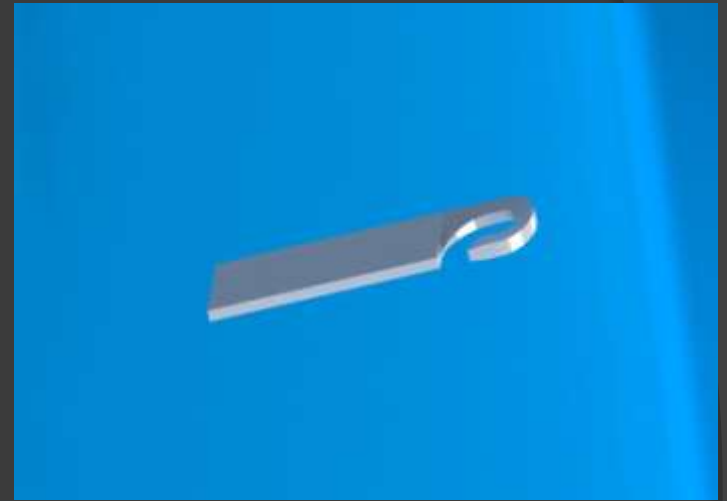
Design #1: Shirt Button Hook

◎ Pros

- Functional
- Cheap
- Easy To Manufacture
- Light-weight (Can Put in Pocket)

◎ Cons

- May Be Too Small
- May Be Difficult to Use



Design #2: Hook for Jean Buttons



Pros: Cheap, Can stay on button and hidden by belt, releases tension, adjustable

Cons: May be difficult to use (Not Intuitive); Still need to test for functionality & material

Cuff Link Button

- ⦿ Lack of a dominant dexterous hand
 - Nearly impossible to button by own hand
 - Difficult to use tool with prosthetic
- ⦿ Change to easier to use buttons
 - Needs to be easily attached to clothing when clothes are off
 - Needs to button once hands are through

Design #3: For Cuff Buttons

Directions

- Stick the new button on buttonhole side.
- Snap or pin bottom end of button to the other edge of cuff
- Use flat surface to snap buttons in place

Magnetic:

- Very easy to button
- Magnets
- should not go in laundry

Snap on:

- Cheaper
- Can go in laundry
- More difficult to snap on



Design #3: Design and Usage Feasibility

- ◎ Cheap, Easy to use materials (< \$1 per set)
 - Aluminum (cents)
 - Magnet (most expensive)
 - Pin or clip (cents)
- ◎ Task is similar to putting on a cuff link
 - Can be very stylish (cost/price changes with style)
 - Can be good enough for general public as well
- ◎ Magnets, if too strong, can be dangerous to items sensitive
 - Watches, credit cards, electronics
 - Can be mitigated using weaker magnets

Future Design Considerations

- ◎ Specific Improvements for Design #3:
 - Need to make an easily attachable and concealable pin or snap on inner cuff
 - Make sure all parts are thin enough to be worn comfortably at all times
 - Make sure buttons snap easily together
- ◎ Will do testing for people to put designs on with one hand
- ◎ Process: Design, Prototype, Get Feedback, Iterate

Thank You!
Any questions?