IMPROVEMENTS IN PREOPERATIVE HAIR REMOVAL

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Client: Dr. Gregory Hartig
Advisor: Dr. Naomi Chesler
Outline

- Introduction
  - Need for Surgical Hair Removal
  - Current Methods
  - Problem Statement & PDS Summary

- Designs
  - Design Options
  - Design Matrix

- Future Work

- Acknowledgements
Need for Hair Removal

- Allows later removal of skin less painful
- Allows later removal of wound dressings less painful
- Makes surgical procedures easier because hair not in way

Current Methods

- Three types:
  1. Electric Clipper
  2. Razors
  3. Depilatory creams

Electric Clipper

- **Skin Integrity**
  - Skin condition preserved since hair cut above surface
  - Less likely to damage skin

- **Hair residue**
  - Length approximately 0.03 in

- **Hair Removal Time**
  - Less than 5 min for knee to groin
  - Up to 45 min for neck to ankle

At 117X magnification
www.3M.com/healthcare

Razor

- **Skin Integrity**
  - Skin susceptible to damage through cuts, nicks, scrapes

- **Hair Residue**
  - Hair cut at or below surface
  - Sharp hair follicles may cause irritation when regrowing

- **Hair removal time**
  - Similar to clippers

At 117X magnification
www.3M.com/healthcare

Depilatory

- **Skin Integrity**
  - may cause allergic reaction

- **Hair Residue**
  - Dissolved at or below skin surface

- **Hair removal time**
  - Approximately 20 min including application & cleanup
  - May become longer with incomplete hair removal

At 117X magnification
www.3M.com/healthcare


Client: Dr. Greg Hartig, ENT & Plastic Surgeon at UW Hospital

Suction device should be:
- Simple and time efficient
- Hypoallergenic
- Non-damaging to the skin
- Compatible with preexisting suction in all ORs and/or suction devices (-200 mmHg)
- Capable of preventing loose hair from contaminating surgical site
- Universal for different hair types/surgeries
Design 1: Trimmer Design

- Snaps directly on head of clipper, catch hair immediately after cut
- Hair trap: screen before suction tubing
- Small size: will not reduce suction, only hold limited of amount of hair
- Inexpensive

Created by Kimberly Maciolek
Design 2: Brushes Design

- Used primarily to pick up hair
- 2 rotating bristled cylinders move hair into center suction tube
- Adjustable brushes according to hair type/skin type
- Pivoting handle for easy maneuvering

Created by Cody Williams
Design 3: Fan/Blade Design

- 4 Pieces to the design
- Reusable electric motor
- Gear system
- No need to trap the hair

Created by Cody Williams
# Design Matrix

<table>
<thead>
<tr>
<th>Categories</th>
<th>Weight</th>
<th>Trimmer Design</th>
<th>Brushes Design</th>
<th>Fan/Blade Design</th>
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<td>3</td>
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<td>Safety</td>
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Future Work

- Focus on Trimmer design
- Construction of prototypes
- Small design variations to improve efficiency, ergonomics
  - Test different hair traps
  - Move suction attachment
- Testing on loose synthetic hair, stuffed animals or fur pelts
- 3D printing
Acknowledgements

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- Dr. Gregory Hartig, client
- Dr. Naomi Chesler, advisor
Any Questions?