Product Design Specifications

Improvements in Preoperative Hair Removal
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Kim Maciolek (Team Leader), Marie Greuel (Communicator),
Cody Williams (BWIG), Jay Kler (BSAC)

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Function: Current methods in preoperative hair removal, brushing hair aside or picking it up with tape, are ineffective and messy. The client, Dr. Greg Hartig, has requested a universal device that attaches to suction already present in the OR that is capable of collecting hair after a patient is shaved. This device should be able to collect hair from any part of the body and do so in an efficient manner. It is essential that the hair retrieved does not plug or impede suction.

Client Requirements:

Our client wants a retraction device is:

- Compatible with -200 mmHg suction present in OR
- Capable of removing hair more efficiently than current method (tape)
- Handheld & easy to use
- Applicable for different types of surgery and varying hair types
- Inexpensive
- Not be abrasive to skin or causes other harm to the patient
- Simple Storage

Design Requirements:

1. **Physical and Operational characteristics**

a. *Performance requirements:* Needs to be compatible with the already existing suction, which has a pressure of 200 mmHg. The device will only be used once.

b. *Safety:* Device must be made of hypoallergenic materials (ex. No latex). Device also cannot puncture or burn the skin or break superficial blood vessels.

c. *Accuracy and Reliability:* Device must be capable of collecting hair more efficiently then current methods (ie tape). Hair must not impede suction of the device.

d. *Life of Service:* The device will be disposable but must be able to fill filter with hair and prevent release of hair if failure were to occur.

e. *Shelf Life:* The device must be kept sterile and must be easily storable in large quantities.

f. *Operating Environment:* Device will be exposed to various amounts of hair, wet and dry hair, shaving creams, antiseptics, blood and bodily fluids. Device will be used at room temperature and pressure.

g. *Ergonomics:* Device should be easily handheld and easy to use by one user. Hose attachment and strength of suction should not prohibit functionality.

h. *Size:* Device is approximately 5 cm wide and 27.5 cm long. The bendable plastic tubing has a diameter of 2.4 cm.

i. *Weight:* The device weighs 36 grams, which does not impede or prevent any user.

j. *Materials:* Device should use hypoallergenic material and be able to withstand operating environment as described in part *f.* Current materials include vinyl and other types of plastic as well as electrical and duct tape.

k. *Aesthetics, Appearance, and Finish:* Finish should be conducive for gripping and have no ill effects on patient.

2. **Production Characteristics**

a. *Quantity:* At least one functional prototype is needed. Design should be conscious of possible mass production.

b. *Target Product Cost:* Design should be competitive to the current method.

3. **Miscellaneous**

a. *Standards and Specifications:* Design must not harmful to patients and meet operating room requirements.

b. *Customer:* Client is environmentally conscious and would prefer a reusable or semi-reusable device. Functionality is a priority to the client and therefore will consider many different designs.

c. *Patient-related concerns:* Device cannot be harmful to patients and must remove hair as to prevent infection.

d. *Competition:* Competition includes the tape currently being used in operating rooms.