Endotracheal Tube Pressure Monitor
Client: Dr. Lester Proctor
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Team Members
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Function:
The purpose of this project is to construct a pressure monitor that will be permanently attached to the endotracheal tube. This pressure monitor will let the doctor know, qualitatively, how much the cuff on the endotracheal tube has been inflated.

Client requirements:
- **Monitor the cuff valve pressure consistently using qualitative markers**
- **Device is as small as possible (pencil eraser size)**
- **Permanently attached to the endotracheal tube**
- **Versatile enough to function on any type/size ETT**
- **Low manufacturing cost**
- **Disposable**

Design requirements:
1. Physical and Operational Characteristics
a. *Performance requirements*: Pressure monitor must perform at a level equivalent to competing devices.

b. *Safety*: Must be FDA approved for humans. Device cannot be made out of any latex material due to allergies.

c. *Accuracy and Reliability*: Must be very consistent, qualitatively. Accurately measure three pressure ranges (10-15 cm H2O, 15-25 cm H2O, and above 25 cm H2O). Can be +/- 2 cm H2O away from actual pressure.

d. *Life in Service*: Must last for duration of patient intubation, (short or long term). Disposable.

e. *Shelf Life*: Device should last as long as the endotracheal tube. Because both the endotracheal tube and the pressure monitor will sealed in a sterilized package, package can last one year.

f. *Operating Environment*: Even though the product will be made as a disposable, it should be able to withstand the temperature (180°F) and chemicals used (ethylene oxide) during sterilization. Product can otherwise be used in any hospital setting.

g. *Ergonomics*: Easy to use and read, and must not get in the way of patient or any hospital staff

h. *Size*: Ideally, as small as possible. Pencil eraser size is the target (1 inch length)

j. *Materials*: Cannot be made out of latex due to allergies. It would also be preferred if none of the parts were made out of ferrous material, since iron can distort MRI scan data. Also, because this will be a disposable product, productions materials must not leave bad footprint on environment.

k. *Aesthetics*, *Appearance, and Finish*: Smooth, clean appearance. Device should be easily readable by anyone.

2. Production Characteristics
a. *Quantity*: working prototype.

b. *Target Product Cost*: during mass production, less than a dollar

3. Miscellaneous
a. *Standards and Specifications*: FDA approval required for commercial product.

c. *Patient-related concerns*: No need for product sterilization because it is disposable. However, should the need arise; the product will be able to withstand the sterilization process.

d. *Competition*:

Rusch Inc Monitor Cuff Endotest Rusch.

Cufflator Endotracheal Tube Cuff Pressure Monitor by Posey.

Brandt TM tracheal tube.

Hi-Lo® Tracheal Tube with Lanz® Pressure Regulating Valve

Mallinckrodt Endotrol® Tracheal Tube with Controllable Tip

And many more.