Placenta Extraction Model

Project Design Specifications
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Clients: Dr. Lee Dresang, UW Department of Family Medicine

Problem Statement:

Our team has been tasked by Dr. Lee Dresang of St. Mary's hospital to create a teaching model for the manual removal of the placenta. During a normal birth the placenta is delivered within 15 minutes after the baby is delivered. If the placenta is not delivered, it must be removed manually. Since this occurs rarely, many general practitioners and doctors in rural areas are not experienced in manual placenta removal, which puts patients at risk during the procedure. Dr. Dresang currently has simulation aids used to teach birthing procedures, but none of the models incorporate a placenta that must be manually extracted. We propose to create a molded silicone model of the placenta and then develop a method to attach the placenta model to the current birthing simulation.

Client Requirements:

- A prototype shall be designed and manufactured.
- The system shall be reusable.
- This system shall be a better teaching tool than current methods.
- The model shall incorporate multiple scenarios for placenta delivery.

1. Physical and Operational Characteristics

A. **Performance requirements**: The model shall simulate a manual extraction of a retained placenta and educate the user about the procedure. It shall simulate scenarios of varying placenta locations and conditions.
B. **Safety**: The prototype must not be harmful to the user or model.
C. **Accuracy and Reliability**: TBD
D. **Life in Service**: The model must last for the duration of the current model, approximately 50 uses.
E. **Operating Environment**: The model shall be versatile and used in a hospital, conference setting, or outdoors.
F. **Ergonomics**: There are no ergonomic concerns relating to the prototype.
G. **Size**: The placenta model shall be the average size and shape to a real placenta and must be compatible with the current pelvic model.
H. **Weight**: The placenta model shall be of similar weight to a real placenta. The overall prototype shall be as lightweight as possible to ensure easy transport.

I. **Materials**: The material used must not harm the existing pelvic model or the user and be of similar texture to reality.
J. **Aesthetics, Appearance, and Finish**: The model shall have realistic coloring and texture to reality.

2. Production Characteristics

A. **Quantity**: One prototype shall be produced.
B. **Target Product Cost**: The budget for this semester is $150.

3. Miscellaneous

A. **Standards and Specifications**: The final product will require the approval of the Food and Drug Administration and clinical trials. The prototype is a proof of concept, and therefore will not require government approval.
B. **Customer**: The intended user is a medical professional or researcher who will utilize Digital Beam Attenuation to improve CT image quality during a medical procedure or for diagnostic purposes.
C. **Patient-related Concerns**: As our design may eventually be commercially available for medical professional use, it should follow all restrictions enforced by the Food and Drug Administration. It must not cause any harm to its user.
D. **Competition**: Most pelvic models include a placenta, but does not incorporate its manual extraction.