The Laryngeal-Modular Skin Retractor

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Biomedical Engineering Capstone Design

Background

- Problem: Manual retraction and stitching to drapes are only forms of retraction in throat operations
- These operations are anywhere between 6 to 7 hours
  - fatiguing, and failure of sufficient retraction
- Affects surgical assistants and indirectly the surgeon
- Currently there are no devices specific for throat operations
- New device will reduce the need for manual retraction, making operation more efficient
  - sequentially, will make operations more cost effective for hospitals

Design Objectives & Functions

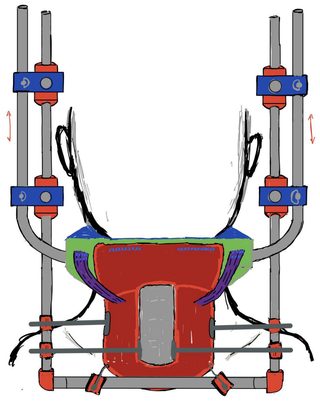

Figure 1. Top view of modular retractor

- Retracts edges of skin and muscle tissue
- Not obstructive to the surgical window
- Fixed when in set position
- Holds incision for extended period of time

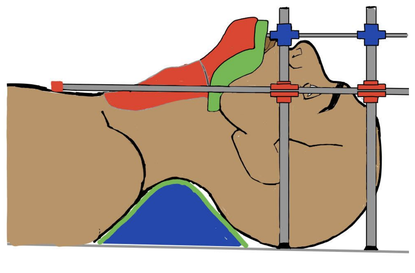

Figure 2. Side view of the modular Retractor

Design Description

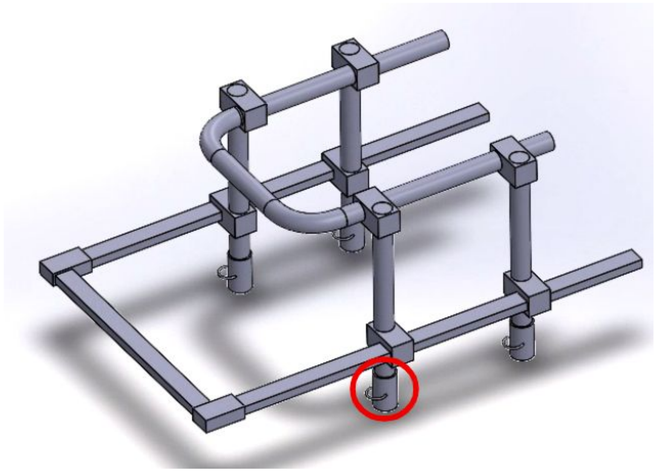

Figure 3: SolidWorks Model of the Laryngeal-Modular Retractor.

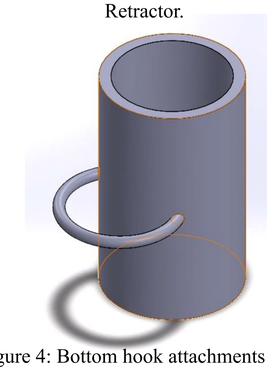

Figure 4: Bottom hook attachments for straps to lock device to table.

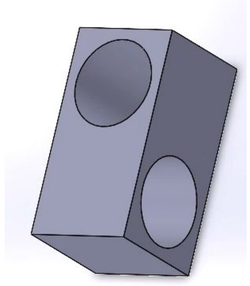

Figure 5: Connector pieces for adjustability.

Validation Results

- Design was unobstructive, modular, and reduces the need for surgical assistants to manually retract skin tissue and muscle.
- Design was biocompatible and able to be autoclaves with disassembly
- Structurally inept to withstand the forces of skin elasticity and muscle

Results (cont.)

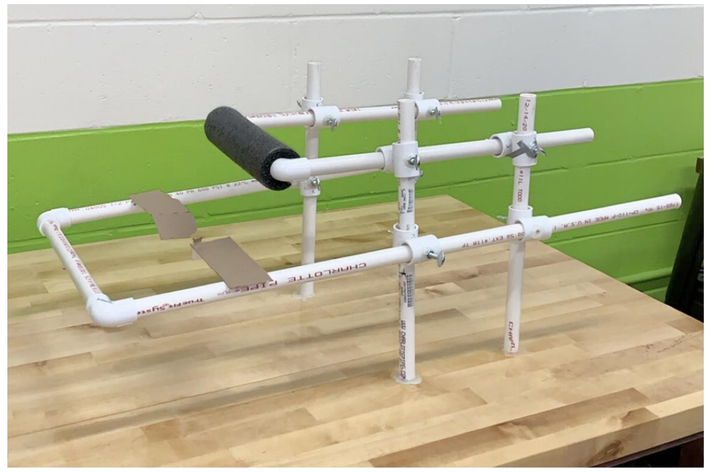

Figure 6: Complete assembly of prototype I of the modular self-retaining skin retractor

- Device can function while not obstructing surgical field of view
- The top bar could hypothetically be used for retraction of mouth operations
- Device is suitable for assembly based upon connection pieces and the material used

Discussion & Conclusions

- Design was ideal for both mouth and throat operations
- Device was unobstructive to the surgical window

Next Steps:

- full stainless steel model
- disassembly steps and autoclave compatibility tests for adjustment
- Possible patent

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