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Title

Preventing Injury and Over-Insertion of Laparoscopic Trocars

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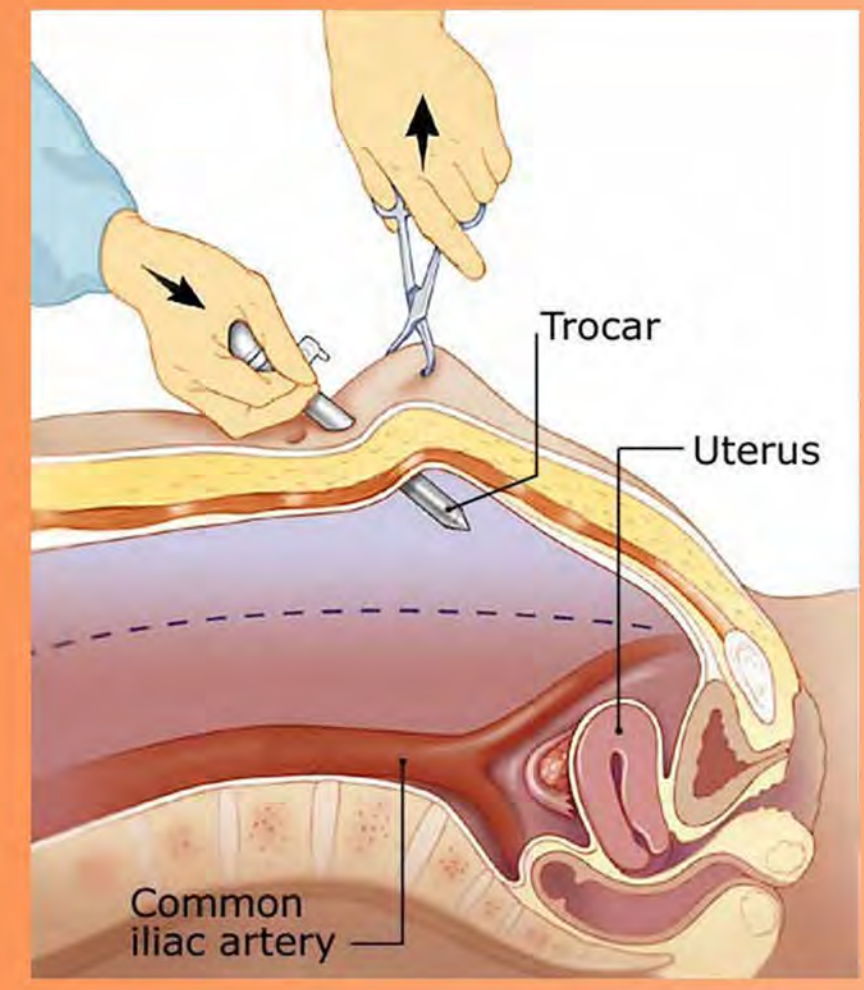
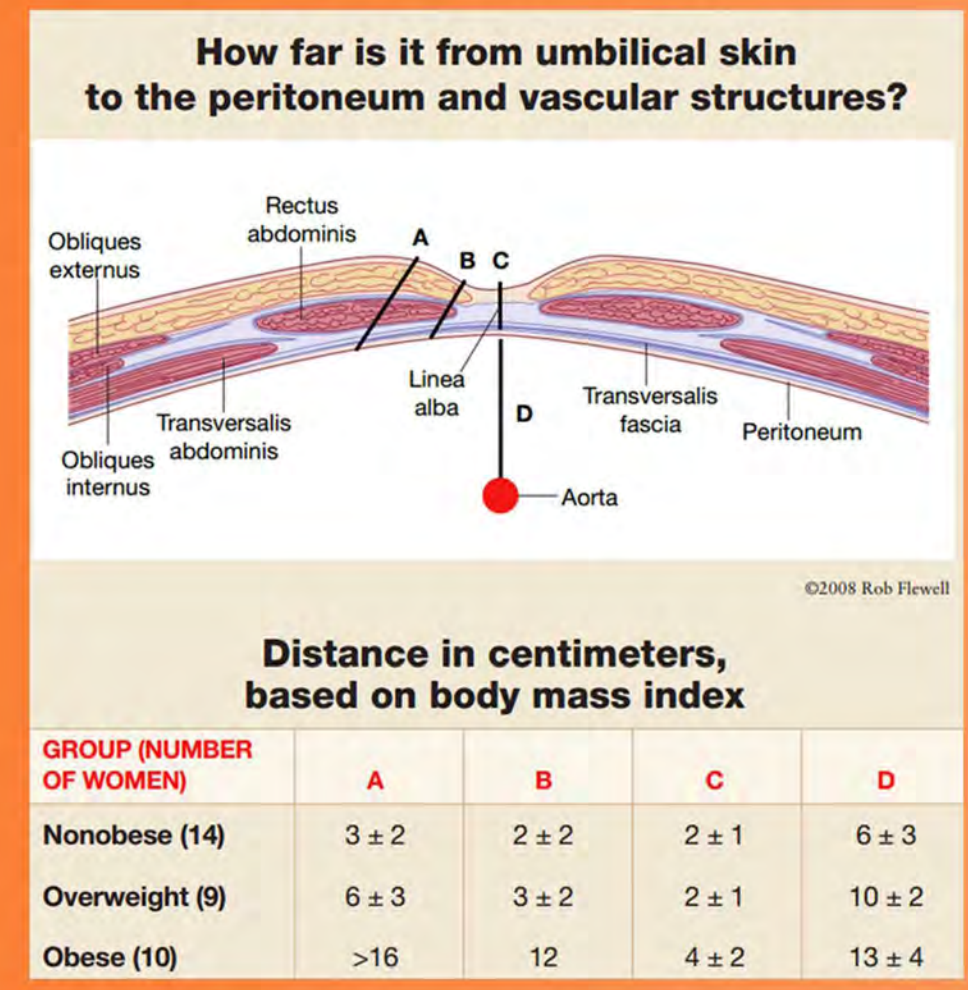
Preventing Injury and Over-Insertion of Laparoscopic Trocars

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 Advisors: Dr. Samir Shreim, Michelle Khine and Albert Yee; Graduate Student Advisors: Elena Liang and Phil Thomas

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Problem Statement

The critical step in laparoscopic surgery is the primary trocar insertion because it is executed with limited visibility of organs inside. Over-insertion frequently occurs due to either inability to stop a breaching trocar or by failure to accurately judge depth of insertion.



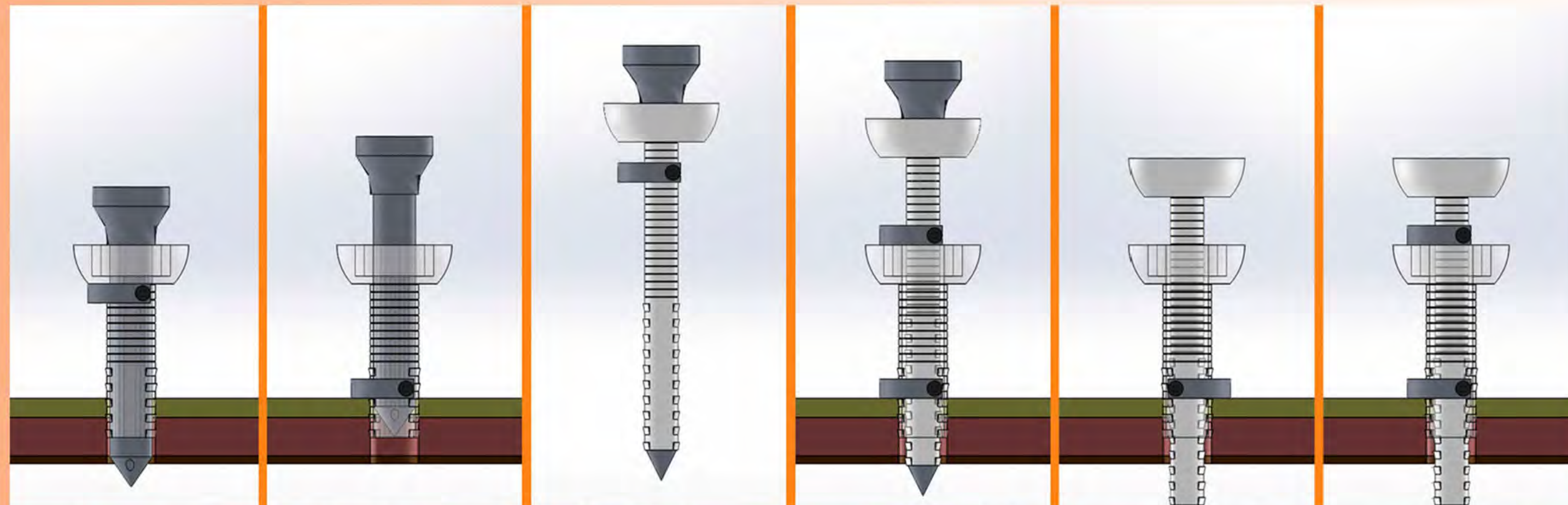
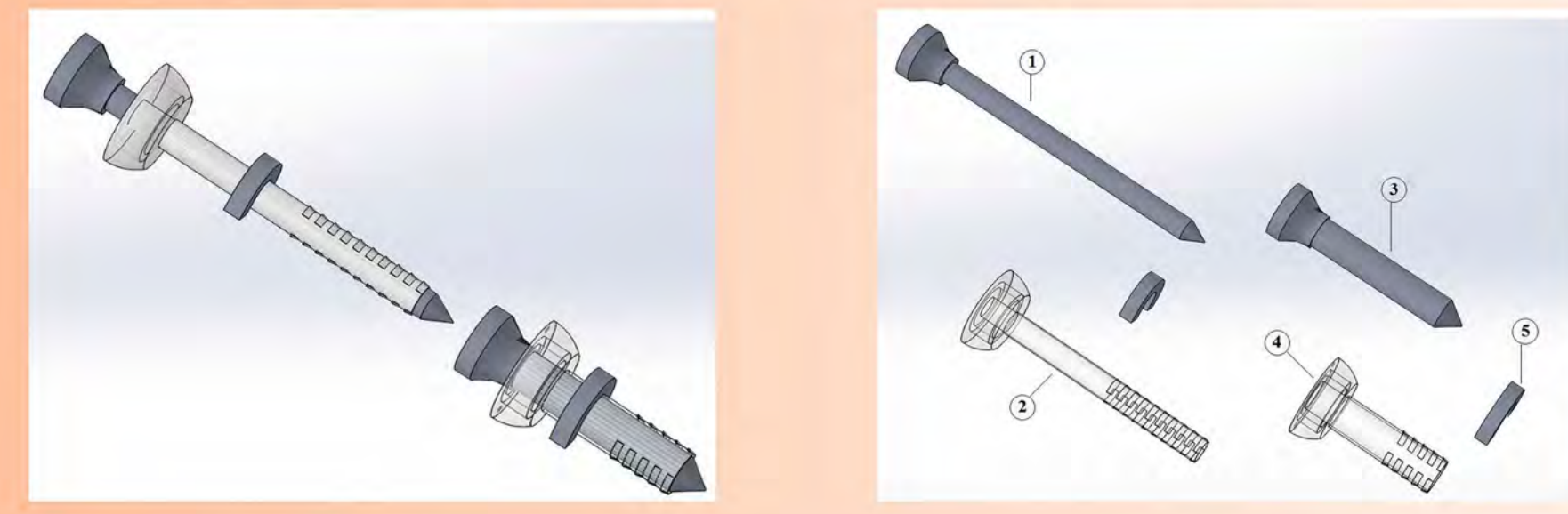
Background

Laparoscopic Surgery is a minimally invasive surgical procedure that offers patients benefits that are more favorable than traditional open surgery. The benefits include minimal scarring, less pain and discomfort, and fast recovery. However, this procedure gives surgeons many drawbacks, such as a confined working space, reduced dexterity, and obscured vision. With 5 million laparoscopic procedures done worldwide in 2013, 3 million in the US alone, it is a necessity to address the issues surgeons are facing in order to meet the patients' growing demands for laparoscopic surgery.

Current Progress

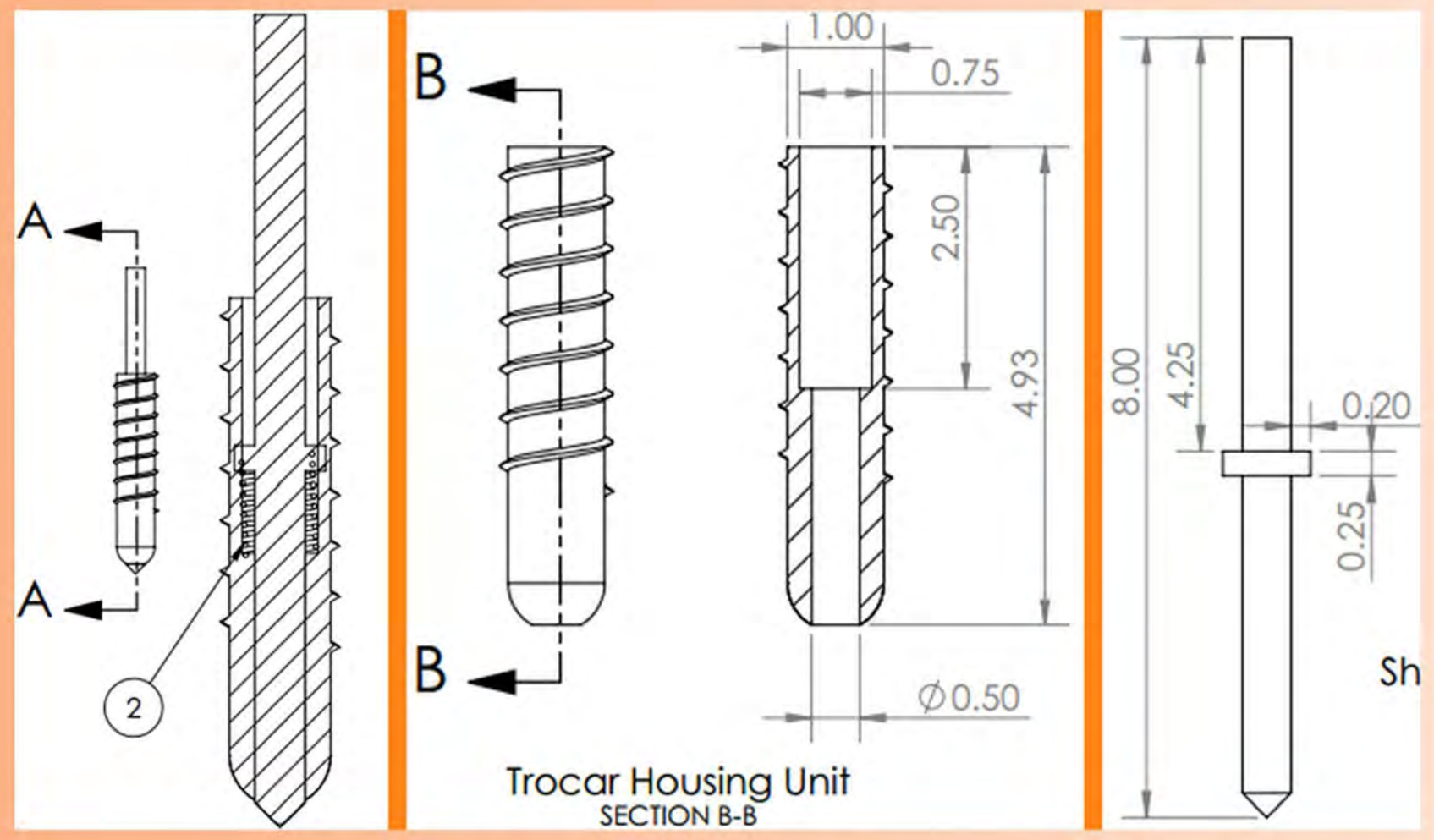
Design Concept

Proposition 1: Automated Retraction
 Dual Cannula-Trocar System



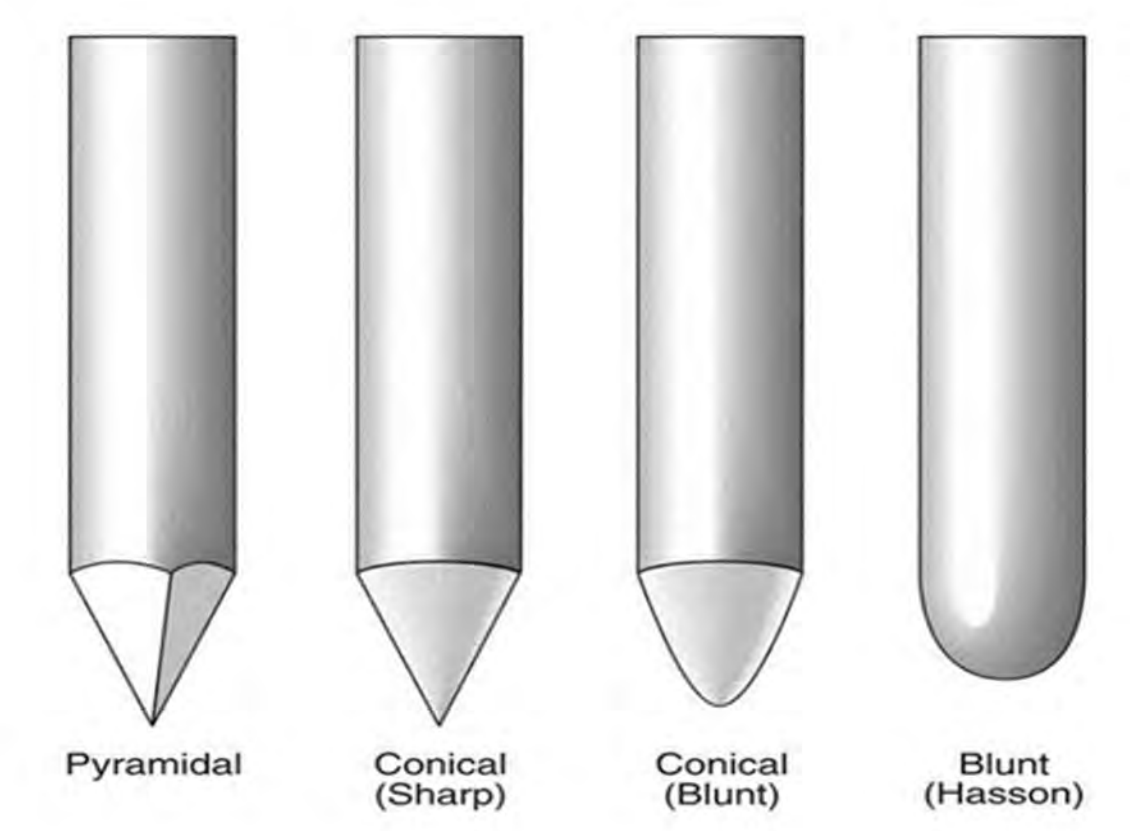
Trocar 1 Set Clamp on Trocar 1 Set Clamp on Trocar 2 Complete Adjust Cannula Perform Surgery

Proposition 2: Incremental Insertion with Spring-Loaded Retraction



Design Criteria & Specifications

1. More control on insertion force: ≤ 13 mmHg
2. High removal force: ≥ 10 mmHg
3. Low organ/vessel puncture risk: ≤ 3 mm over-insertion
4. Reduction of fibrous damage
5. Ease of use



Timeline

Current State: Prototyping design
End of March: Complete early prototype
End of May: Validation and Presentation

Acknowledgement

We would like to acknowledge Phil Thomas, Dr. Shreim, Dr. Khine and Dr. Yee for assisting us in research and development.

Contact

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