

Artemis: a Non-Slipping Trocar for Laparoscopic Surgery

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MISSION STATEMENT

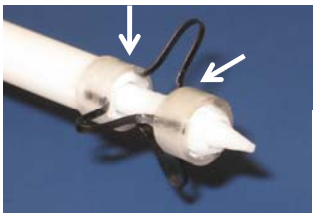
Surgical trocars are tubular instruments that are inserted into the abdomen and allow for passage of surgical instruments into the operative field during laparoscopic surgery. Approximately 2 million laparoscopic surgeries are performed in the U.S. annually and about 60,000 patients experience complications after surgery due to trocar-related incidents. The largest problem surgeons have is outward slippage, which necessitates time-consuming reinsertion which can widen incisions and cause hernias and scarring. Our innovative trocar, Artemis, eliminates trocar slippage with an easy-to-use deployable mechanism that safely holds itself in the abdomen.

MARKET

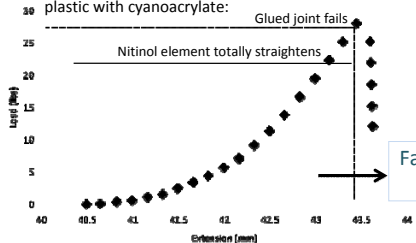
- Est. \$400M trocar market
- Largest players: Johnson & Johnson, Tyco, Applied Medical
- 7.2% annual growth
- We intend to capture 2% upon launch, or \$12M annually

TESTING AND RESULTS

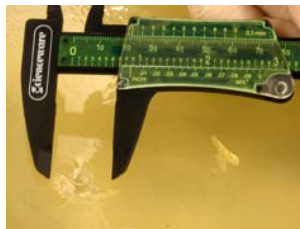
Sound Construction:
Testing Metal-Plastic Bonding



Tensile test of Nitinol bonding to ABS plastic with cyanoacrylate:



Measuring Tissue Defect Size:
Insertion in "Tissue" Gel



Artemis 0.85 in
Competitor 0.65 in

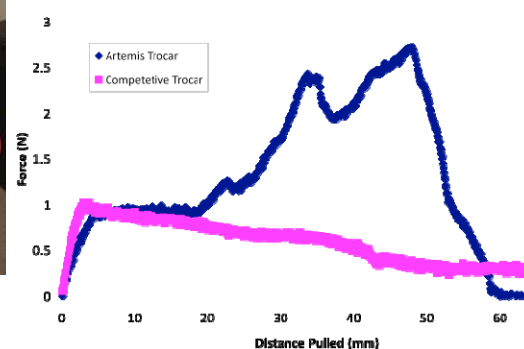
We hope to match competitive defect size with improved manufacturing.

Testing Slip Resistance:
Pulling out of Model Abdomen



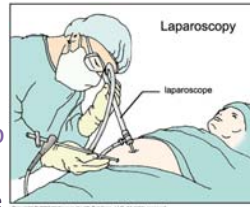
In a simulated abdomen constructed from ballistics gel, we found the Artemis trocar developed substantial outward slippage resistance compared to the competing trocar before the collagen gel ruptured.

Resistance Force Developed by Trocar while Pulling



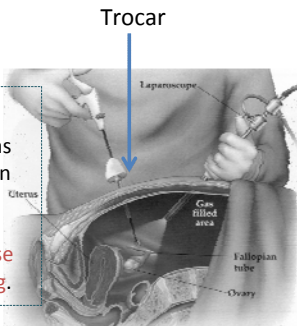
BACKGROUND

- Laparoscopy: minimally invasive abdominal surgery
- Trocars provide access to the abdomen.
 - ≥3 used per procedure
- 3M performed annually
 - Gastric Bypass
 - Appendectomy
 - Cholecystectomy

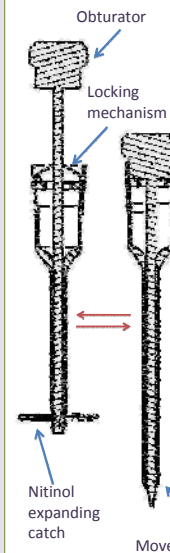


Trocar Slippage:

The abdomen is filled with gas to better operate, but this can push trocars out. Trocar reinsertion takes time and can widen incisions, cause hernias, and increase scarring.



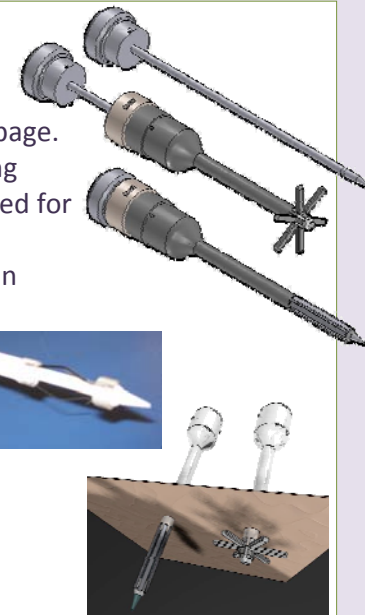
ARTEMIS INNOVATION



Artemis features a radially expanding tip that resists slippage. Nitinol hairpins form a gripping catch and are easily streamlined for insertion with the custom obturator, which safely locks in place.



Obturator "grabs" the moveable collar, pulling the expanding ribbons flat for insertion.



CONCLUSION

- Artemis provides an effective and safe solution to trocar slippage.
- Using a deployable, expanding catch, it holds itself against the inner abdominal wall.
- We anticipate substantial benefits to both surgeons and patients and strong penetration in the growing ~\$400M trocar market.

Acknowledgements

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