Reduced Stapler Fires and Improved Maneuvering in Colorectal Procedures: Echelon 3000

Andrea Hernandez-Moreno[1];Daniel Aillaud-De Uriarte[2]; Diego C Marines-Copado, MD, FASCRS[3]
1. Universidad Anáhuac Puebla; 2. Universidad de las Américas Puebla; 3. Houston Methodist Willowbrook Hospital

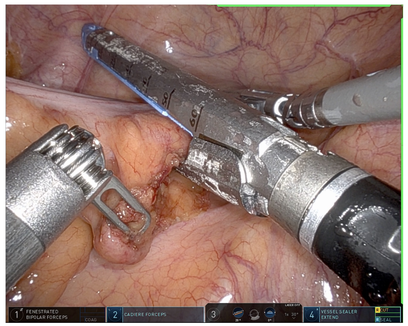
Background

- Surgical staplers with the ability to have precise placement have provided improved functionality in colorectal surgery.
- Technological development of staplers has shown to reduces the number of fires, which in consequence **reduces the risk of anastomotic leakage.**
  - Number of firings are determined by tissue flow, perpendicular access and cutline length.
  - Narrow spaces a single fire can be challenging.
    - Male pelvis risk of leak is 1.7 times more frequent than in women.

Objective of Technology or Device

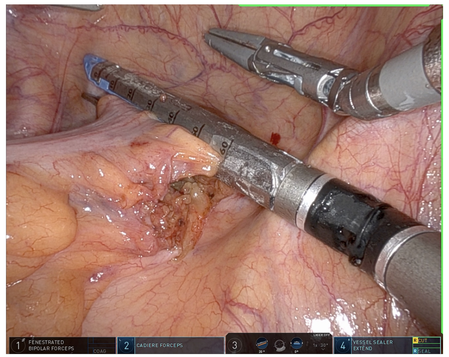
Echelon 3000 (ECH3) is intended to have improved control with a larger articulation spam and jaw aperture; allowing to have an easier and **stronger staple line** in the pelvis, therefore, reducing the risk of complications.

Method of Application

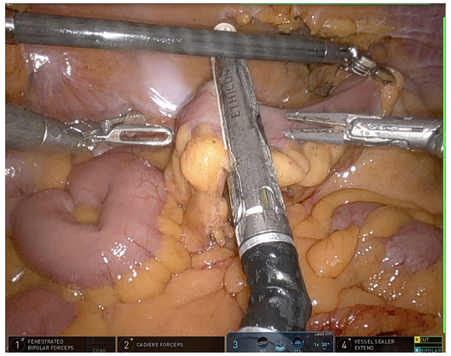


ECH3 surgical staplers have the purpose of **transaction, resection and creation of anastomoses**, using GST reloads. It has improved access for challenging anatomy, such as the pelvis.

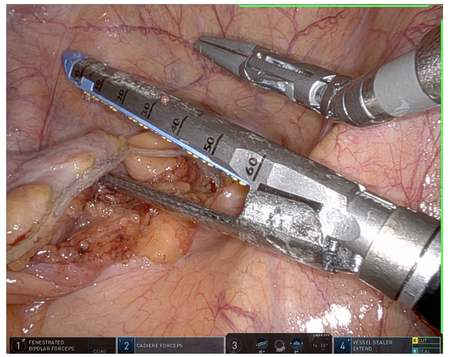
Description of Technology



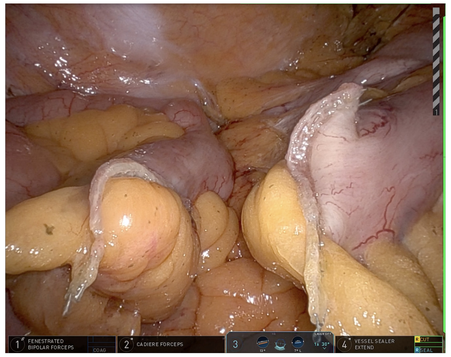
- ECH3 has 24-27% greater articulation and 39-57% wider jaw aperture than the current leading hand-held laparoscopic staplers, SigniaTM Powered Stapler with Tri-Staple Technology (SGN).



- ECH3 60 mm has 30% higher chance to complete a transaction with one firing than SGN 60 mm.
- ECH3 has 95% fewer malformed staples.



- The greater probability of one transaction increases surgical efficiency and reduces complications caused by crossing staple lines.



- ECH3 reduces the risk of leak, mostly due to malformed staples that can compromise the integrity of the staple line.
- ECH3 has 88% fewer leaks below 40 mmHg and 67% fewer leaks below 50 mmHg than SGN.

Conclusion and Future Directions

- ECH3 includes recently developed features to enhance its functionality, through improves access with a **greater articulating range and jaw aperture.**
- These features **improve accessibility in the pelvic area** and allows stronger seals; consequently, fewer to no malformed staples, greater grasping force and effector stability.
- Clinical studies in colorectal surgery, including procedures such as Low Anterior Resection, should be performed in order to determine the benefits.

References

Gaidry, A. D., Tremblay, L., Nakayama, D., & Ignacio, R. C., Jr (2019). The History of Surgical Staplers: A Combination of Hungarian, Russian, and American Innovation. The American surgeon, 85(6), 563–566.
Huang, Z. F., Vandewalle, J. A., Clymer, J. W., Ricketts, C. D., & Petraiuolo, W. J. (2022). Improving Performance and Access to Difficult-to-Reach Anatomy with a Powered Articulating Stapler. Medical devices (Auckland, N.Z.), 15, 329–339. https://doi.org/10.2147/MDER.S379717
Zarnescu, E. C., Zarnescu, N. O., & Costea, R. (2021). Updates of Risk Factors for Anastomotic Leakage after Colorectal Surgery. Diagnostics (Basel, Switzerland), 11(12), 2382. https://doi.org/10.3390/diagnostics11122382
Huang, Z. F., Vandewalle, J. A., Clymer, J. W., Ricketts, C. D., & Petraiuolo, W. J. (2022). Improving Performance and Access to Difficult-to-Reach Anatomy with a Powered Articulating Stapler. Medical devices (Auckland, N.Z.), 15, 329–339. https://doi.org/10.2147/MDER.S37971

Acknowledgments

- Diego Marines-Copado, MD is a consultant for Intuitive, Johnson & Johnson and Edwards
- There are no other disclosures to report