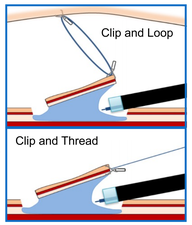
# Magnetic Twisted String Actuated Endoscopic Submucosal Dissection (ESD) Retraction Device

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## Introduction & Objectives

- Adoption of ESD has been slow due to the technical difficulty, length of surgery, and lack of appropriate tools available.
- Current techniques for tissue retraction are cumbersome and the degree of retraction is difficult to adjust.



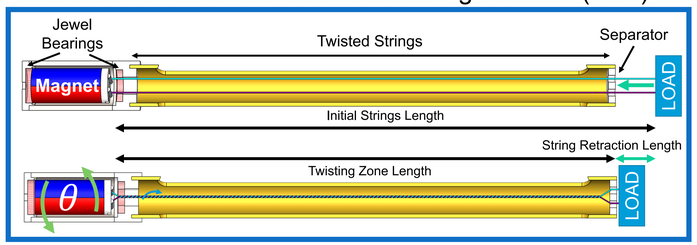

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**There is a need for a new medical device that:**

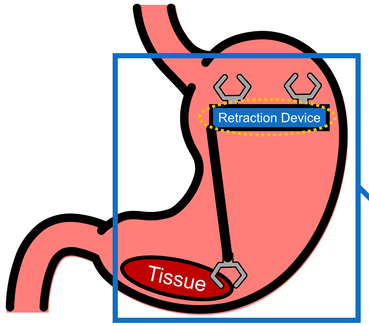
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| Gives surgeons independent control of tissue tension to reduce the technical difficulty of ESD | Functions deep within the gastrointestinal tract |

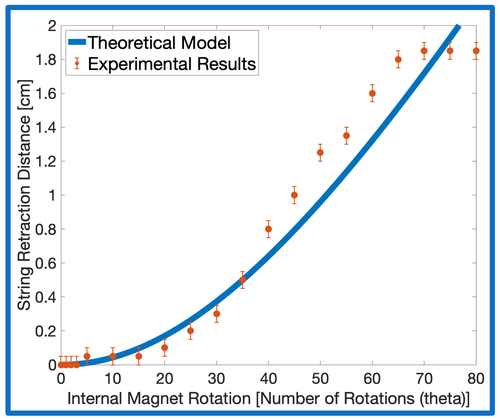
## Materials & Methods

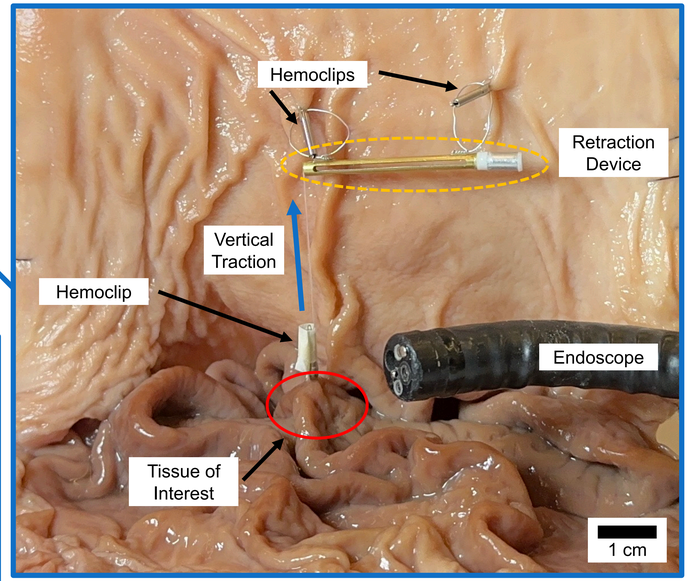
To function independently deep within the human body, the retraction device uses magnetic actuation and a micro-transmission called twisted string actuator (TSA).




## Results




Clinical feasibility was demonstrated by deploying the device in ex vivo gastric porcine tissue and providing internal vertical traction through wireless actuation by applying a rotating magnetic field using an electromagnetic navigation system.

## Conclusion

Development of this novel ESD retraction device would grant surgeons improved control throughout an ESD procedure by providing adequate visualization through adjustable tissue tension.

Greatly improving patient clinical outcomes by expanding the use of ESD, shortening procedure times, and minimizing complications.

Driving the Western adoption of this minimally invasive resection procedure and potentially further expand its future medical applications.

## Future Survey Analysis

- To provide professional design feedback and aid in device development please scan the QR code or email: haley.mayer@mail.utoronto.ca to complete a survey
- The NEEDs analysis for an innovative ESD surgical tool survey intends to investigate the need for a new ESD surgical tool and evaluate the current state of the technique

## Procedure Description:

Device inserted through the endoscope into surgical space → Device anchored to the tissue using hemoclips → Retraction is achieved by wirelessly actuating the device by applying a rotating magnetic field → Finally, the device is removed from the space

## Literature Cited

1. H. Mizutani et al., “Recent Development of Techniques and Devices in Colorectal Endoscopic Submucosal Dissection,” Clin. Endosc., vol. 50, no. 6, pp. 562–568, Nov. 2017.

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