

GRIPTRACT-GI™ ENDOSCOPIC TISSUE MANIPULATOR: AN INNOVATIVE ACCESSORY TO IMPROVE ENDOSCOPIC SUBMUCOSAL DISSECTIONS

Eric D Moyer, MD[1]; McKell Quattrone, MD[1]; Joshua Winder, MD[1]; Vamsi Alli, MD[1]; Kevin A Snook, PhD[2]; Olga M Ocon-Grove, PhD[2]; Eric M Pauli, MD[1]

[1]Penn State Health Milton S. Hershey Medical Center [2]Actuated Medical, Inc., Bellefonte, Pennsylvania, USA.

OBJECTIVE

- GripTract-GI™ Endoscopic Tissue Manipulator Upper GI Model is a cap-based endoscopic accessory designed to improve tissue handling and efficiency during endoscopic submucosal dissections (ESD).
- Designed to be used in the esophagus, stomach, and duodenum.
- **We aim to evaluate efficacy of the tissue manipulator during *en-bloc* dissection of gastric mucosal tissue in an *ex-vivo* porcine model.**

TECHNOLOGY APPLICATION

- This prototype aims to expand the application of ESD to lesions previously deemed unresectable via endoscopy.
- Two-knob handpiece mounts near endoscope controls and allows dynamic application of traction and countertraction through manipulator arms (**Figure 1**).
- Mounts to most standard endoscopes 9.8-10.5mm in diameter
- Distal Cap increases device diameter by ~9mm, serves equivalent standoff function as standard distal attachments.
- Increases the length by only 3.8mm and diameter by ~9mm.
- Used in conjunction with an electrosurgical knife.
- Does not affect the use of through-the-scope tools such as clips, wires, snares, etc.

PRELIMINARY RESULTS

- Slightly increased resistance with insertion and removal of the endoscope compared to without GripTract-GI™ accessory.
- Maneuverability with the GripTract-GI™ accessory installed allowed for complete visualization of the stomach.
- Full 180° retroflexion was difficult to achieve without manipulation of the torque sheaths, but a methodology was developed to reach full retroflexion with manipulation.
- Total dissection time, measured from injection needle insertion to complete dissection, was improved with GripTract-GI™ when used by fellowship-trained surgical endoscopists.
- Two gastric perforations occurred by the electrosurgical knife during ESD with the GripTract-GI™ installed when used by a physician without surgical endoscopy training.

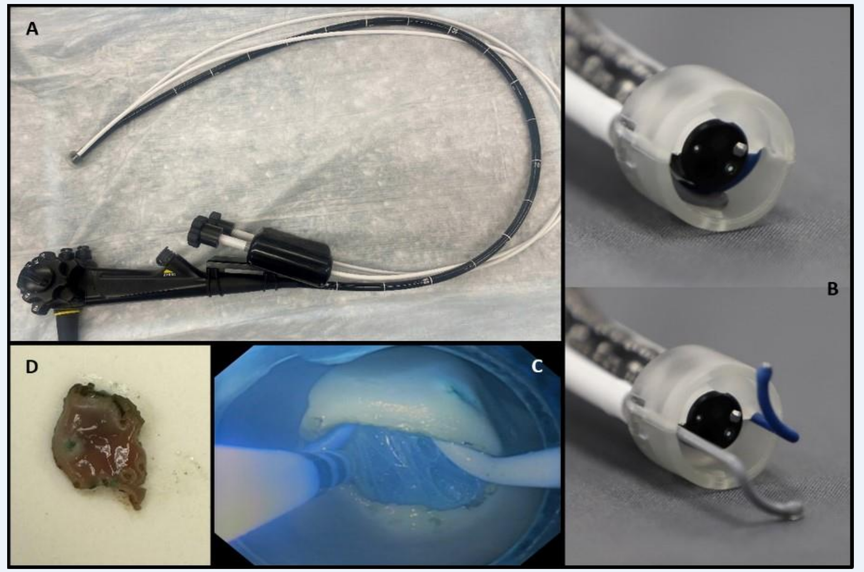


Figure 1: A. Endoscope with GripTract-GI™ accessory installed. **B.** GripTract-GI™ accessory cap with its manipulator arms retracted and extended. **C.** ESD utilizing both manipulator arms and electrosurgical knife technology. **D.** GripTract-GI™ ESD specimen.

Surgical Endoscopist times

	Standard ESD			GripTract-GI™			
	Time (min:sec)	Width (mm)	Length (mm)	Time (min:sec)	Width (mm)	Length (mm)	Δ Time (min:sec)
1	**33:06**	17	12	**25:22**	15	20	**-7:44**
2	**28:12**	24	25	**24:52**	17	17	**-3:20**

Non-Surgical Endoscopist times

	Standard ESD			GripTract-GI™			
	Time (min:sec)	Width (mm)	Length (mm)	Time (min:sec)	Width (mm)	Length (mm)	Δ Time (min:sec)
1	**5:22**	6	10	**21:18 ***	8	7	**+15:56**
2	**14:18**	11	9	**>30:00 ***	7	15	**> +15:42**

* Gastric perforation

CONCLUSIONS

- Successful ESD with complete removal of specimen achieved with better efficiency and reduced procedural time when performed by fellowship-trained surgical endoscopists.
- There is a steep learning curve for physicians with limited experience in surgical endoscopy.
- Although full retroflexion is achievable by independently advancing the torque sheaths, this may pose challenges when using the device in areas such as gastric fundus or GE junction. Development of an anchoring mechanism would benefit maintaining the torque sheath position.
- Additional *ex vivo* testing required to evaluate efficacy of the GripTract-GI™ Upper GI model in locations not amenable to standard ESD.