Novel traction device for endoscopic submucosal dissection: a rotatable transparent cap, an additional channel, and a traction wire

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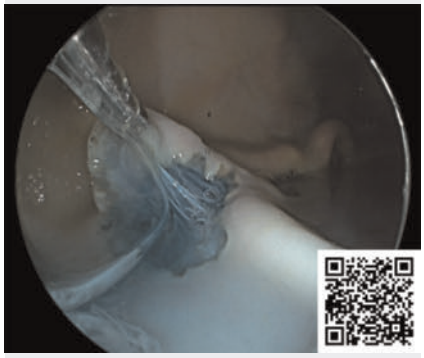
▶ **Fig. 1** Structure and functionality of the rotatable transparent cap device (Micro-Tech, Nanjing, China). **a** The rotatable transparent cap unit consists of a transparent cap with a rotatable ring in the middle section. A nylon wire threaded through a channel in the rotatable ring is fixed at its midpoint to the ring. **b** Auxiliary channel fixed to the rotatable ring. **c** Ends of the nylon wire that is connected to the ring and additional channel. Both ends of the wire can be used to pull the ring, rotating it. **d** The wire can be pulled to rotate the auxiliary channel on the ring around the transparent cap, enabling precise control.



▶ **Video 1** Structural features, functionality, and application of the novel traction device for endoscopic submucosal dissection (ESD) using an isolated pig stomach.

Traditionally, endoscopic procedures have been limited to a single–channel device, making it difficult for endoscopists to perform endoscopic submucosal dissection (ESD). As a result, several solutions have been developed, each with its own advantages and disadvantages, including traction devices [1, 2], double-channel endoscopes [3], laparoscopy–endoscopy combined surgery [4], and surgical endoscopic robots [5]. To address these challenges, we fabricated a rotatable transparent cap with a fixed channel that can accommodate endoscopic surgical instruments.

The traction device consists of three components: a rotatable transparent cap, an additional channel, and a traction wire (▶ **Fig. 1**). The additional channel and traction wire are connected to a rotatable ring on the transparent cap. By pulling the traction wire, the additional channel can be rotated around the transparent cap (▶ **Fig. 1**).

During ESD, foreign-body forceps are inserted into the additional channel to clamp and push the tumor to the distal end, acting as a traction device. During the operation, the position of the additional channel can be controlled dynamically by pulling the traction wire. To assess the efficacy of this device, we performed ESD in four directions: downward, upward, leftward, and rightward. The results demonstrated that this rotatable transparent cap device enables dynamic rotation of the foreign-body forceps in various directions to apply traction (▶ **Video 1**). This not only decreases the complexity of the procedure and the associated risks, but also leads to a significant reduction in operation time and incidence of complications.

In conclusion, this device exhibits promise for facilitating traction during ESD, simplifying the procedure and eliminating the need for specialized endoscopic equipment.

Endoscopy_UCTN_Code_TTT_1AQ_2AD

Acknowledgments

The authors express their deepest gratitude to Dr. Shuntian Cai's research team, whose expertise and dedication were instrumental in the development of the novel traction device. Their innovative thinking and tireless efforts significantly advanced the design. The staff at the Endoscopy Center provided valuable support, technical assistance, and insightful suggestions, greatly contributing to the success of this study. The expertise of manufacturers Micro-Tech in producing traction devices and their meticulous attention to detail ensured the accuracy and reliability of our results. Finally, we thank the reviewers and editors for their constructive feedback and suggestions, which have significantly improved the quality of this manuscript.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Endoscopy 2023; 55: E70–E71
DOI 10.1055/a-2222-6958
ISSN 0013-726X

Georg Thieme Verlag KG, Rüdigerstraße 14, 70469 Stuttgart, Germany