



Endoscopic Submucosal Dissection of a Large Rectal Lesion by Using a Novel Traction Device to Facilitate Traction Adjustments

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J Digest Endosc

Keywords

- colorectal endoscopic submucosal dissection (ESD)
- Easy Traction-adjustments M-loop (ET-M-loop)

Colorectal endoscopic submucosal dissection (ESD) is challenging for lesions larger than 30 mm.¹ Traction-assisted ESD may enable procedures to be performed safely and has also been shown to shorten procedural time. “Intraluminal through the scope” traction-assisted methods often require changes in traction position and/or the use of additional traction devices due to insufficient traction of the resection fragment.² As the procedure progresses, the weight of the resected specimen in combination with the “volume” of the lesion can occasionally obscure views and lead to difficulty in completing the ESD. We have previously developed the multiloop (M-loop) traction method using silk thread and clips, and reported its efficacy.³ However, modifying traction during ESD with the M-loop can be challenging due to the large size of its central ring. We therefore developed a modified M-loop called the Easy Traction-adjustments M-loop (ET-M-loop), enabling easier traction adjustments during ESD (► **Fig. 1** and ► **Supplementary Video S1**). The ET-M-loop allows the endoscopist to manipulate the central ring onto an appropriate position within the lumen which then allows further traction to be applied as the ESD progresses. The modified loop is constructed by tying 3-0 silk thread to the tip of a 2.5-mL syringe, specifically for the

central loop among the three loops (► **Fig. 1A–C**). This loop is attached to the bottom of half-opened clip, and partially stored in the delivery sheath (► **Fig. 1D, E**). An opened clip can easily pass through the center loop of the ET-M-loop (► **Fig. 1F**).

We present a case in which the ET-M-loop proved beneficial for the management of a large colorectal tumor (► **Supplementary Video S1**). A 60-year-old woman underwent ESD for a 40-mm laterally spreading tumor on the lower rectum (► **Fig. 2A**). We conducted ESD using the ET-M-loop and M-loop. The ET-M-loop traction method provided superior traction (► **Fig. 2B**) and facilitated easier adjustments of the traction position (► **Fig. 2C**) compared to the M-loop traction method. We performed ESD safely with a clear field of view (► **Fig. 2D**). Histological examination revealed tubulovillous adenoma with a traditional serrated adenoma-like component with negative horizontal and vertical margins (► **Fig. 3**).

In recent years, the usefulness of countertraction with the use of traction devices has been widely reported in colorectal ESD.^{3,4} However, large lesions or lesions located in the flexure of the colorectum often do not provide sufficient countertraction. The ET-M-loop not only allows for multiple

DOI <https://doi.org/10.1055/s-0044-1787126>.
ISSN 0976-5042.

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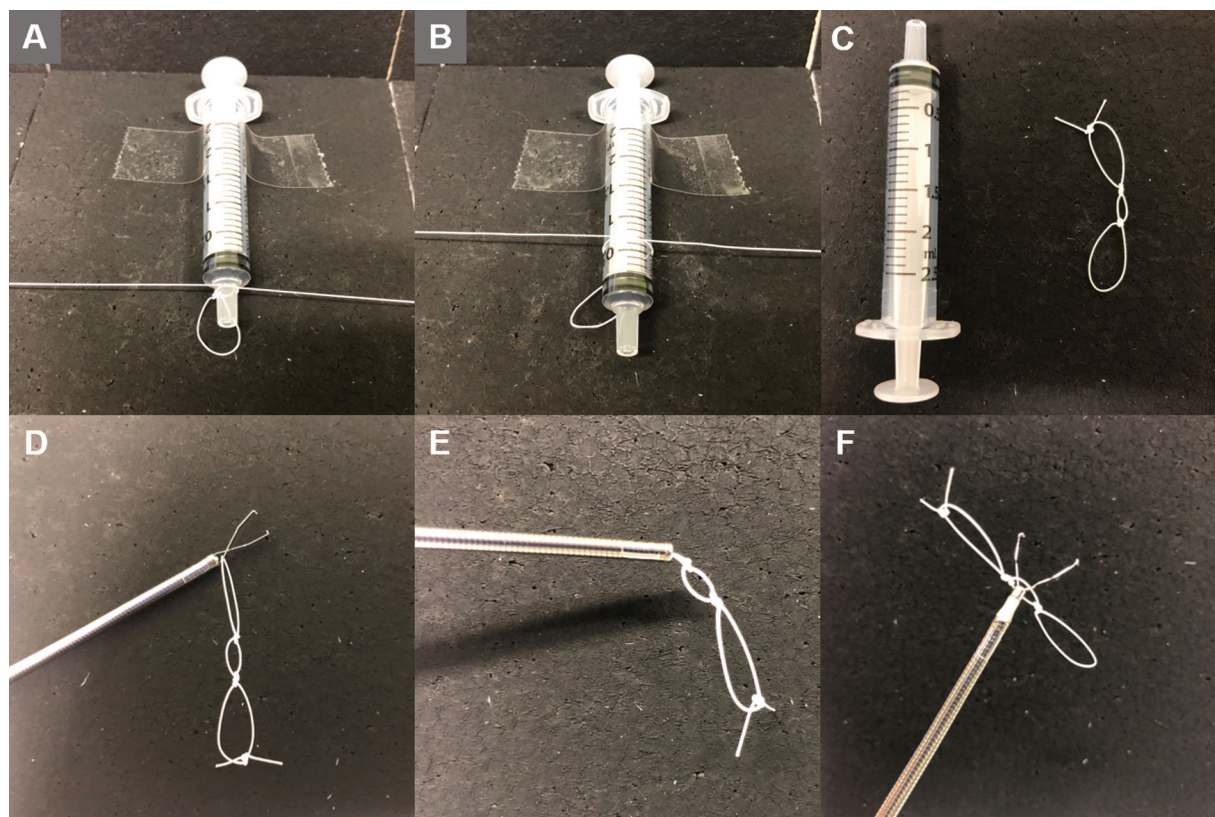


Fig. 1 Creation and insertion of the Easy Traction-adjustments M-loop (ET-M-loop). (A) 3-0 silk thread is tied to the tip (4-mm diameter) of a 2.5-mL syringe to make a central loop. (B) The thread is tied to a 2.5-mL syringe (10-mm diameter) to make a loop at each of both ends. (C) After making each loop in the order (B), (A), (B), the remaining silk thread is cut, ET-M-loop is made. (D, E) After the ET-M-loop is attached to the bottom of half-opened clip, it is partially stored in the delivery sheath. (F) An opened clip can easily pass through the center loop of the ET-M-loop.

Supplementary Video S1

We could easily and safely perform endoscopic submucosal dissection (ESD) of a large rectal lesion by using a novel traction device called the Easy Traction-adjustments M-loop (ET-M-loop) to facilitate traction adjustments. Online content including video sequences viewable at: <https://www.thieme-connect.com/products/ejournals/html/>.

traction adjustments, but also allows for smooth traction adjustments by reducing the size of the center loop. Making the central loop smaller reduced the “allowance” when the loop was grasped with a clip and facilitated traction adjustments (►Fig. 4B, C). In this case, we could easily change traction by using the ET-M-loop and safely perform ESD. The disadvantage of this device is that it requires some time to create the device. On the other hand, the advantages of this device are that it can be easily made and used by endoscopists in areas where traction devices are not commercially available, and it is less expensive than other traction devices (►Fig. 5). We believe that these advantages are sufficient to compensate for the disadvantages.

The ET-M-loop’s creation is relatively easy, as all that is required is to wrap a silk thread around a syringe and tie it.

Therefore, another advantage of ET-M-loop is that there is little difference in the learning curve depending on the creator. The tip to successful attachment of the ET-M-loop on the lesion side is to inject sodium hyaluronate solution mixed with indigo carmine into the submucosa before placing a clip. By injecting sodium hyaluronate solution into the submucosa, the exfoliated mucosa is separated from the muscularis propria and a clip can be securely attached to the exfoliated mucosa.

To apply effective countertraction, we recommend that the clip position on the opposite wall be approximately the same as the clip position on the lesion side (►Fig. 4A, D). If countertraction becomes insufficient during submucosal dissection, we prefer to adjust traction with an additional clip in the same position or slightly the oral side as the leading edge of the dissection (►Fig. 4B, C, E, F). We believe that if a clip on the opposite wall is applied much more oral side than a clip on the lesion side, the specimen will be pulled horizontally and the countertraction will make submucosal dissection more difficult.

We examined submucosal dissection speed (SDS), traction position adjustment time (TPAT), and major complications of ESD (delayed hemorrhage and perforation) in 17 lesions (mean specimen area $914.1 \pm 395.6 \text{ mm}^2$) that were changed in traction position during submucosal dissection using the ET-M-loop. TPAT was defined as the time from

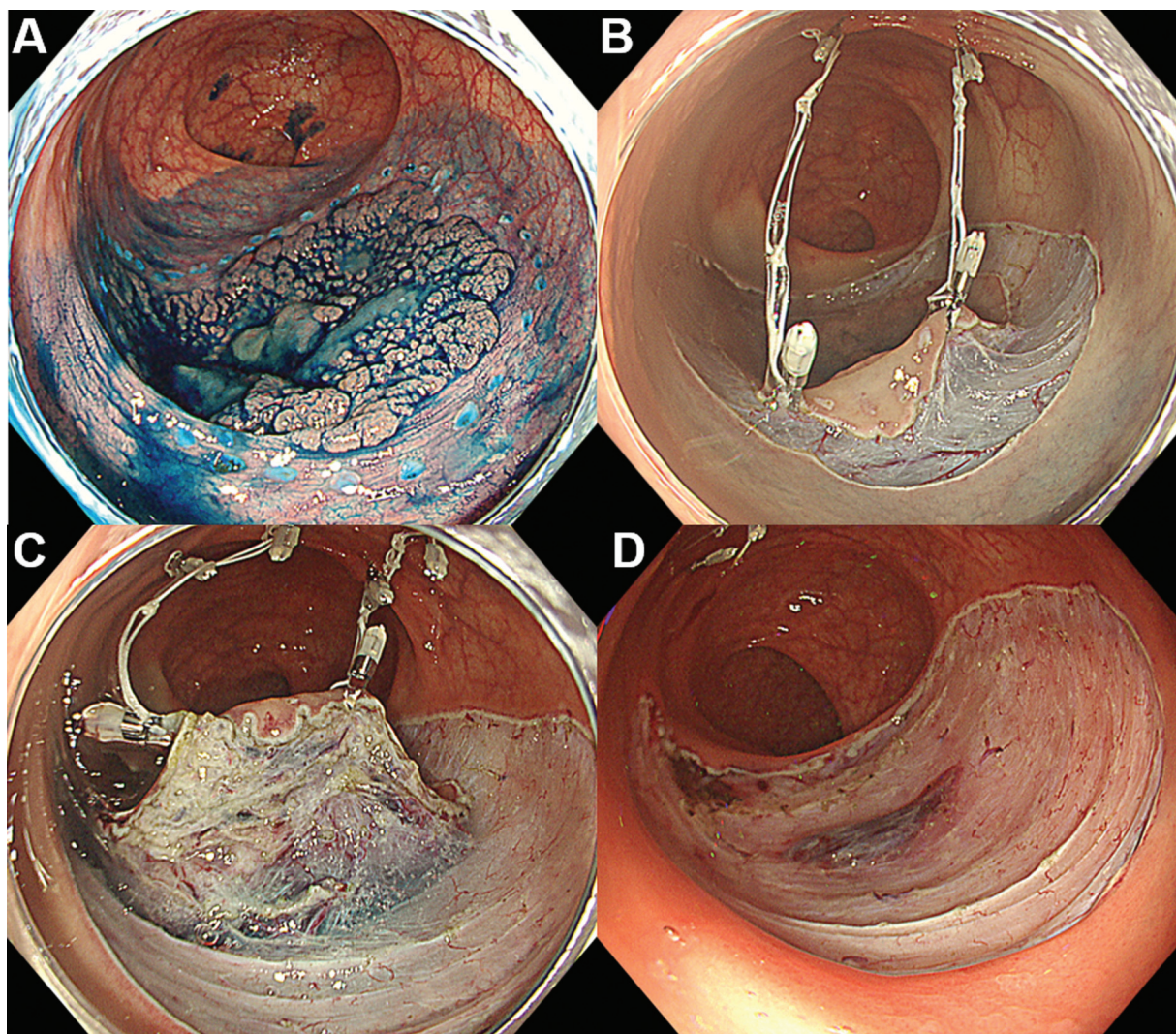


Fig. 2 (A) Endoscopic image of a laterally spreading tumor at the lower rectum. (B) M-loop (left side) and Easy Traction-adjustments M-loop (ET-M-loop) (right side) are attached to the anal side of the cut edge of the lesion. (C) Endoscopic image after adjustments of the traction position by M-loop (left side) and ET-M-loop (right side). (D) Post-endoscopic submucosal dissection (ESD) ulcer.

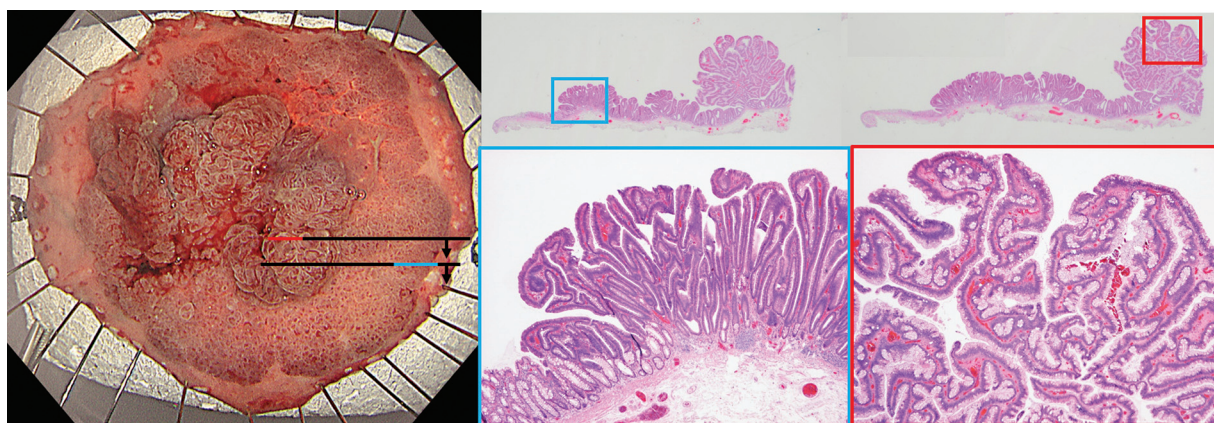


Fig. 3 Histological examination revealed tubulovillous adenoma with a traditional serrated adenoma-like component.

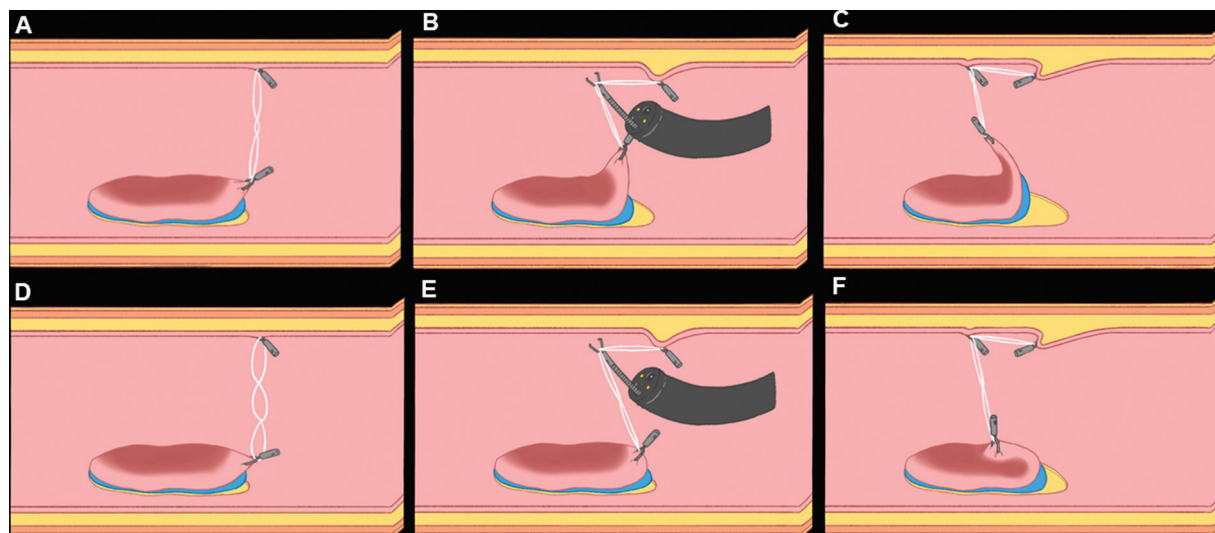


Fig. 4 The difference in countertraction and traction adjustments using the Easy Traction-adjustments M-loop (ET-M-loop) or M-loop. (A) Insufficient traction during submucosal dissection using the ET-M-loop. (B) A traction adjustment of the ET-M-loop with a clip. (C) Effective countertraction after a traction adjustment by ET-M-loop. (D) Insufficient traction during submucosal dissection using the M-loop. (E) A traction adjustment of the M-loop with a clip. (F) Insufficient countertraction after a traction adjustment by M-loop.

Traction devices and required items	Price per one set		
	INR (approximately)	USD (approximately)	JPY
Multi Loop Traction Device* + EZ clip × 2	3421.25 (2300 + 1121.25)	41.11 (27.64 + 13.47)	5950 (4000 + 1950)
S-O clip**	2875	34.55	5000
SureClip Traction Band*** + SureClip × 1	5002.5 (2990 + 2012.5)	60.12 (35.93 + 24.19)	8700 (5200 + 3500)
ET-M-loop + EZ clip × 2	1127 (5.75 + 1121.25)	13.54 (0.07 + 13.47)	1960 (10 + 1950)

*Matsui H, et al. BMC Gastroenterol 2022; 22: 10.
 **Sakamoto N, et al. Gastrointest Endosc 2009; 69: 1370-74.
 ***Micro-Tech Co.,Ltd. (Nanjing)
 Exchange rate: 1 JPY ≅ 0.575 INR
 ≅ 0.00691 USD

Fig. 5 Prices of typical traction devices and minimum required items.

Table 1 Comparison of submucosal dissection speed using different traction devices

		Suzuki et al ³	Tamaru et al ⁴	Our cases ^a
		n = 50	n = 48	n = 17
SDS (mm ² /min)	Mean ± SD	–	25.6 ± 11.4	21.1 ± 11.6
	Mean ± SE	28.0 ± 2.9	–	–
Traction device		M-loop	S-O clip	ET-M-loop
		–	Clip-with-line traction	–
		–	Multiloop traction device	–

Abbreviations: ET-M-loop, Easy Traction-adjustments M-loop; SD, standard deviation; SDS, submucosal dissection speed; SE, standard error.
^aTraction adjustments during submucosal dissection were performed in all cases.

opening the clip to attaching the clip on the other side. Mean SDS was 21.1 ± 11.6 mm²/min, mean TPAT was 62.9 ± 48.4 seconds, and no major complications occurred. Our result for mean SDS was somewhat less good than previously reported results (▶ **Table 1**) using other traction devices. However, we believe that our result for mean SDS is relatively good

because all cases were difficult cases that required traction adjustments due to insufficient traction during submucosal dissection.

This accessory may prove valuable for managing lesions in the colorectum and other organs requiring traction position adjustments during ESD.

Authors' Contributions

H.A., R.S., and T.T. conceptualized the study. H.A. performed the operation, followed up with the patient, and drafted the original manuscript and the video. K.T. and J.W. helped in literature review and writing original draft. R.S. helped in proof reading. K.T., R.S., T.T., and J.W. helped in critical revision of the manuscript. S.I. contributed to expert help with the pathology. H.A., K.T., R.S., T.T., S.I., and J.W. approved the final manuscript.

Consent

Written informed consent was taken from the patient for the publication of the information and imaging.

Financial Disclosure

None.

Conflict of Interest

None declared.

Acknowledgment

We thank to Ms. Jun Mochida (OPEXPARK Inc., www.opexpark.co.jp) for expert help with illustrations.

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