



Dynamic and multifocal clip and band countertraction for endoscopic submucosal dissection

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Endoscopic submucosal dissection (ESD) is a challenging technique that bears a significant risk of perforation. Given that standard endoscopy, unlike laparoscopy, does not permit traction, the difficulty of ESD is augmented. Countertraction techniques have been shown to improve the speed of dissection, the rate of R0 resection, and the safety of the procedure.¹⁻³

Depending on the location, the nature of the lesion, and local availability, several techniques have been described: the clip and line technique (also known as the dental floss technique),^{2,3} the clip and snare technique,⁴ the suture pulley technique,⁵ magnetic countertraction,⁶ the s-o clip,⁷ and the clip and band technique.^{1,8,9} However, the application of most countertraction methods is limited by the anatomic location of the lesion. Moreover, once committed, the axis of countertraction cannot be easily modified.

Recent data have shown the efficacy of clip and band countertraction.^{1,8} The materials needed are readily available and include conventional dental rubber bands (2D [3/16"] 3.5 ounce force) and clips.

If available, a new generation of removable clips (Pulp Medical, Athens, Greece; Hangzhou AGS MedTech Co, Ltd, Hangzhou, Zhejiang, China) can be used to easily detach the band whenever necessary. These clips are reopening; allow 360° bidirectional synchronous rotation control; have a 135° claw angle and opening span of 11 or 16 mm, depending on the model; and are available in working lengths compatible with either a gastroscope or a colonoscope.

The clip can be reopened after deployment by grasping the tip of the clip tightly with a polypectomy snare that has a thin wire (0.36-0.41 mm). Furthermore, a novel endoscopic tool that combines a clip and band in a single device was recently commercialized in the United States.¹⁰ The purpose of this video (Video 1, available online at www.VideoGIE.org) is to demonstrate various strategies of clip and band countertraction in 4 cases in the stomach and colon.

STANDARD CLIP AND BAND COUNTERTRACTION IN THE STOMACH

The first step is to make a circumferential incision and create a short flap on one side (Fig. 1). A clip, grasping a rubber band is inserted into the working channel, and the clip is fixed to the mucosal flap. Next, a second clip is

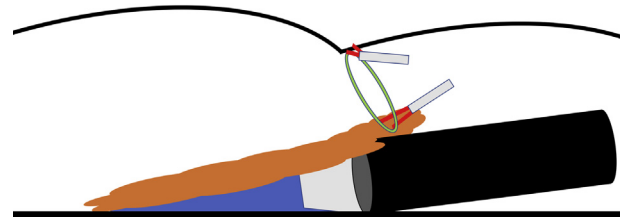


Figure 1. Schematic representation of the clip and band countertraction.

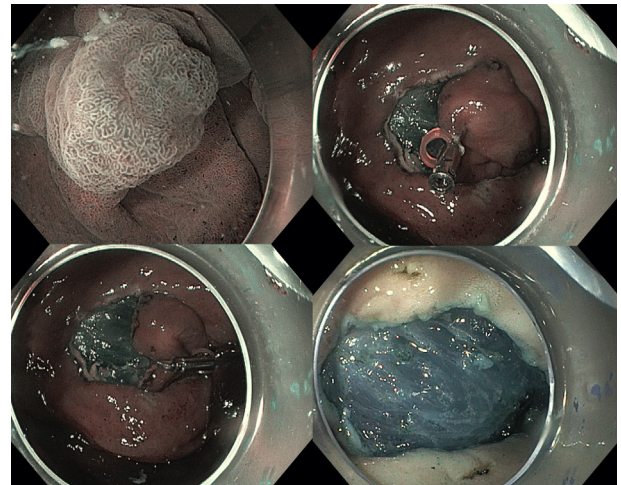


Figure 2. Standard clip and band endoscopic submucosal dissection of a gastric adenoma with low-grade dysplasia.

introduced, grasps the band, and anchors it to the opposite side of the gastric wall, which allows for strong traction of the lesion. This traction allows for a faster and streamlined dissection. Because of the elastic band's properties, the traction remains constant despite the progress of the dissection. At the end of the procedure, the specimen is detached from the wall by cutting the rubber with a loop cutter. Alternatively, the clip can be detached by applying gentle traction with a snare or rat-tooth forceps. We present this technique in the case of a prepyloric antral adenoma (Fig. 2).

DYNAMIC COUNTERTRACTION

The clip and band countertraction method allows for the possibility of axis traction modification dynamically

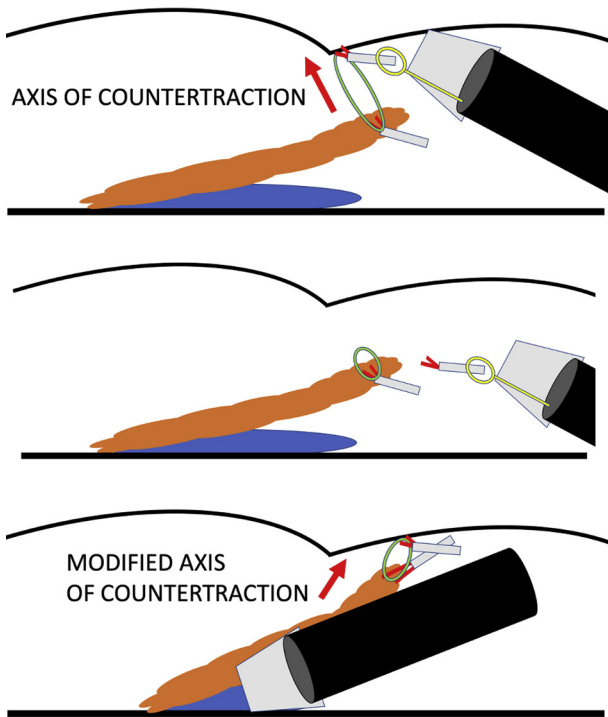


Figure 3. Schematic representation of dynamic countertraction. The axis of countertraction was modified during the procedure as needed by attaching the band to a different point.

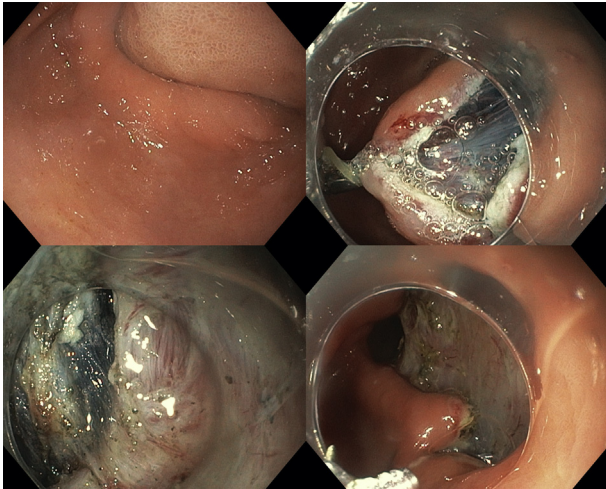


Figure 4. Endoscopic submucosal dissection of a gastric fibroid inflammatory polyp with dynamic countertraction.

during the procedure, according to the dissection strategy. The first attached clip is removed, and the band is then grasped with a new clip and anchored in a new location (Fig. 3). The decision to change the direction of countertraction is made when the initial traction is no longer efficient. We demonstrate this technique for the resection of an obstructive fibroid inflammatory polyp of the antrum (Fig. 4).

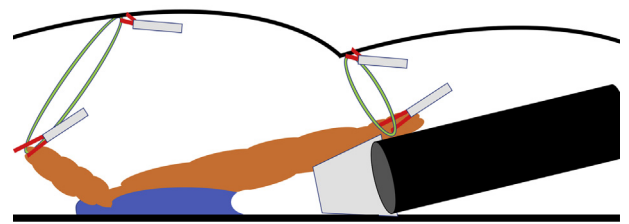


Figure 5. Schematic representation of multifocal countertraction. Multiple bands were placed to apply traction over a broader area.

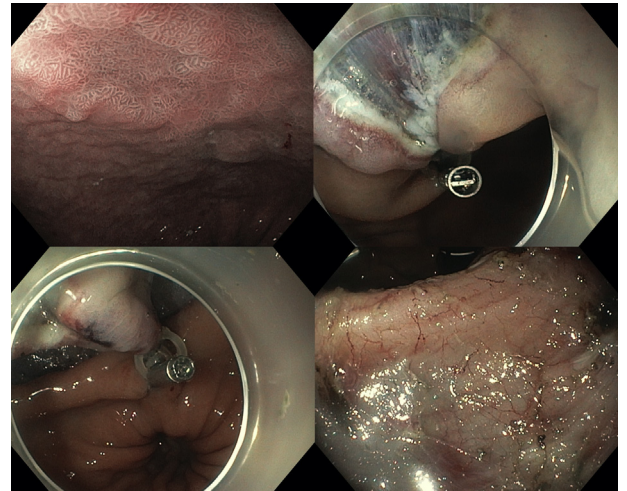


Figure 6. Endoscopic submucosal dissection of diffuse low-grade dysplasia of the gastric incisura with the help of 2 bands.

MULTIFOCAL COUNTERTRACTION

For large lesions in difficult locations, multiple bands can be deployed. Clips and bands anchor 2 or more points of the dissection plane, and tension is therefore exerted over a broad zone of the submucosal plane (Fig. 5). Multifocal countertraction is usually applied for lesions larger than 3 cm, in cases of fibrosis, or in challenging anatomic locations. This technique is demonstrated in a gastric ESD for multifocal dysplasia of the gastric incisura, where retroflexion was technically challenging (Fig. 6).

TECHNIQUE CONSIDERATIONS FOR COLONIC ESD

Typically, a submucosal lift in the colon may be less lasting than that in the esophagus or stomach. In an effort to mitigate seepage of the submucosal cushion and apply countertraction, the pocket creation method⁴ and the single tunneling technique¹¹ can be applied.

Application of the clip and band technique is usually combined with the aforementioned methods. In particular, only a partial, and not full circumferential, incision is performed at the oral side and at the anal side of the lesion.

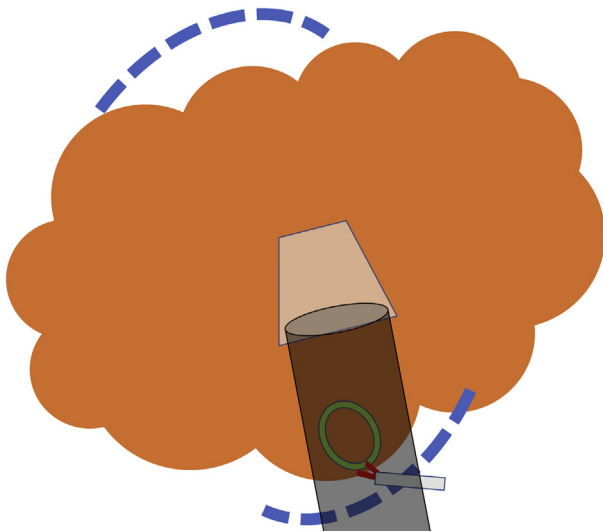


Figure 7. Schematic representation of clip and band countertraction in the colon. Partial oral and anal incisions are preferred, without performing a circumferential incision.

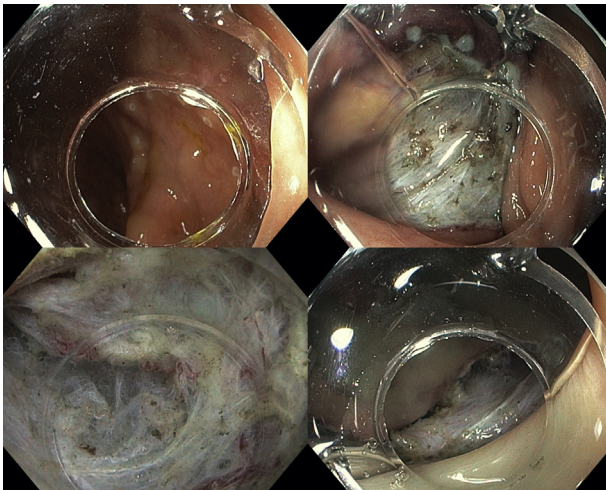


Figure 8. Endoscopic submucosal dissection of a serrated adenoma of the cecum with countertraction.

Next, the clip/band complex is attached (Fig. 7). However, the strategy of circumferential incision before countertraction may still be preferred by some endoscopists. In this video (Video 1, available online at www.VideoGIE.org), we present the case of a 3-cm serrated adenoma of the cecum resected by clip and band ESD, in combination with the pocket creation method and under the saline solution immersion technique for adjuvant space expansion (Fig. 8).

TROUBLESHOOTING

Attention should be paid to avoid placing the first clip before flap creation; a misplaced clip may interfere with further dissection. In particular, the endoscopist should

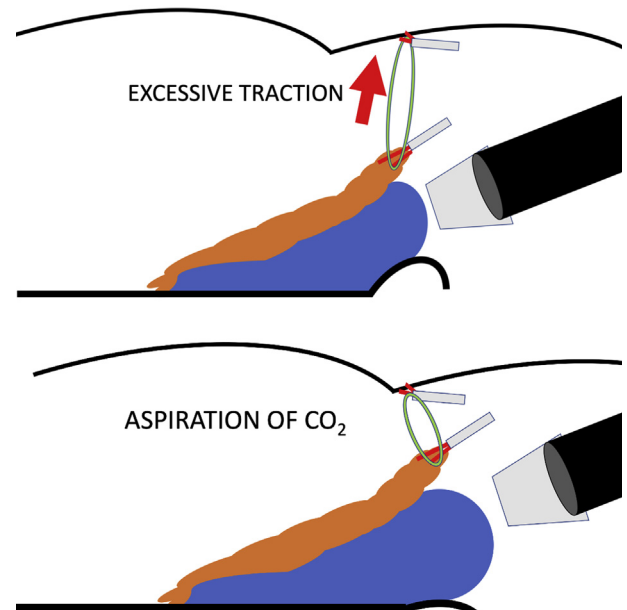


Figure 9. Schematic representation of the effect of excessive traction on the muscle layer. Aspiration of air content can diminish stretching of the muscle layer and reduce the risk of injury.

avoid grasping the muscle layer with the clip because this may lead to deep muscle injury or perforation.

In the event of failure to cut the rubber with the endo-loop cutter, the specimen can be retrieved by applying gentle traction to the tip of the clip with a snare or a rat-tooth forceps.

Another challenge that may be encountered in clip and band colonic ESD is traction that is so strong that it pulls the muscularis propria. In this situation, the endoscopist should try to decompress the bowel lumen to decrease the force of tension that is exerted on the flap (Fig. 9). Alternatively, the clip should be repositioned at a shorter distance.

SUMMARY

In conclusion, the clip and band technique is an efficient method of countertraction that can be applied even in the cecum. The main advantages of this technique are the ability to change the axis of countertraction during the procedure and the opportunity to apply multifocal traction if needed.

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DISCLOSURE

All authors disclose no financial relationships.

Abbreviation: ESD, endoscopic submucosal dissection.

REFERENCES

- Jacques J, Charissoux A, Bordillon P, et al. High proficiency of colonic endoscopic submucosal dissection in Europe thanks to countertraction strategy using a double clip and rubber band. *Endosc Int Open* 2019;7: E1166-74.
- Yoshida M, Takizawa K, Suzuki S, et al. Conventional versus traction-assisted endoscopic submucosal dissection for gastric neoplasms: a multicenter, randomized controlled trial (with video). *Gastrointest Endosc* 2018;87:1231-40.
- Yoshida M, Takizawa K, Nonaka S, et al. Conventional versus traction-assisted endoscopic submucosal dissection for large esophageal cancers: a multicenter, randomized controlled trial (with video). *Gastrointest Endosc* 2020;91:55-65.e2.
- Mavrogenis G, Ntourakis D, Tsevgas I, et al. Pocket endoscopic submucosal dissection with countertraction and partial full-thickness excision as salvage therapy for advanced colonic adenoma with severe fibrosis. *VideoGIE* 2018;3:211-2.
- Ge P, Angsuwatcharakon P, Chang GJ, et al. The suture pulley countertraction method for challenging rectal endoscopic submucosal dissection. *VideoGIE*. Epub 2020 Mar 31.
- Matsuzaki I, Isobe S, Hirose K, et al. Magnetic anchor-guided endoscopic submucosal dissection for colonic tumor. *VideoGIE* 2017;2:74-5.
- Nagata M. Modified attachment method using an S-O clip for gastric endoscopic submucosal dissection. *VideoGIE* 2019;4:151-3.
- Mavrogenis G, Mavrogenis I, Anastasiadis S, et al. Underwater endoscopic submucosal dissection in saline solution with rubber-band countertraction for a cecal polyp extending into a diverticulum. *Ann Gastroenterol* 2019;32:527.
- Oung B, Walter T, Hervieu V, et al. Nonampullary duodenal subepithelial neuroendocrine tumor removed R0 by endoscopic submucosal dissection with double clips and rubber band traction. *VideoGIE* 2019;4: 570-3.
- Ge, Phillip S, Aihara H. A novel clip-band traction device to facilitate colorectal endoscopic submucosal dissection and defect closure. *VideoGIE*. Epub 2020 Mar 31.
- Mavrogenis G, Tsevgas I, Kasapidis P, et al. Single tunneling technique for the resection of lateral spreading adenomas. *Ann Gastroenterol* 2017;30:580.

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