



## Modified attachment method using an S-O clip for gastric endoscopic submucosal dissection

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Endoscopic submucosal dissection (ESD) has been an established treatment for gastric neoplasms.<sup>1</sup> However, gastric ESD is still challenging because of its technical difficulties.<sup>2</sup> Many traction methods have been developed to overcome the technical difficulties of gastric ESD.<sup>3-5</sup> The traction method provides good visualization of the submucosa and appropriate tension for the lesion. However, in most traction methods, the direction of traction is limited to the oral side, and interference between the endoscope and the traction device in the cardia is unavoidable.<sup>6</sup>

The S-O clip (Fig. 1; Zeon Medical, Tokyo, Japan) is a novel traction device that has a 5-mm spring with a 4-mm nylon loop at the clip claw. The S-O clip provides traction in any direction, and interference with the endoscope can be avoided by use of the modified attachment method involving an S-O clip. The S-O clip has been developed as a traction device for colorectal ESD,<sup>7,8</sup> and it is considered useful for gastric ESD (Video 1, available online at [www.VideoGIE.org](http://www.VideoGIE.org)).

After the lesion is separated from the peripheral mucosa, the S-O clip is attached to the edge of the lesion in the direction in which the nylon loop comes over the mucosa, by use of the modified attachment method. This procedure simplifies the hooking of the nylon loop using the anchor clip both in the forward and retroflexed positions of the endoscope; however, with the conventional attachment method using an S-O clip, the nylon loop comes under the mucosa.<sup>9</sup> Subsequently, a regular clip is used to anchor the nylon loop of the S-O clip to the opposite side of the lesion. Finally, the extension of the spring provides traction for the lesion.

With the conventional attachment method using an S-O clip, the nylon loop comes under the mucosa to avoid falling of the head of the S-O clip after anchoring, obstructing the submucosal dissection. However, the fallen head of the S-O clip will invariably not matter because it can be easily turned over by the hood attached on the tip of the endoscope. Moreover, when the conventional attachment method is used, it becomes difficult to anchor the nylon loop using an endoscope in the retroflexed position. The retroflexed position is often selected in gastric ESD, unlike in colorectal ESD; therefore, the modified attachment method may be better than the conventional attachment method in gastric ESD. Even with the modified attachment method using an S-O clip, traction is sufficiently achieved.



**Figure 1.** The S-O clip has a 5-mm-long spring and a 4-mm-long nylon loop at one side of the clip claws.

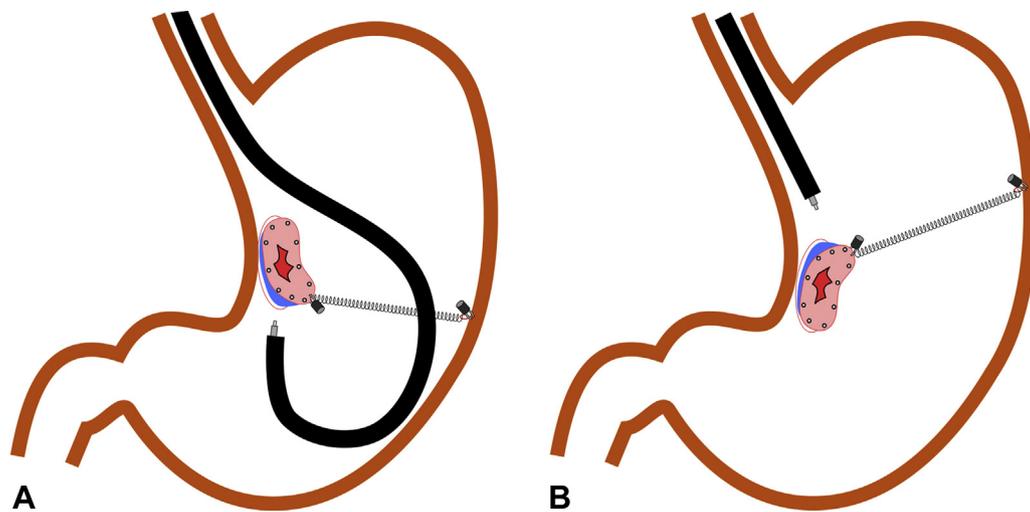
After complete dissection, the S-O clip is detached from the gastric wall and extracted out of the body along with the specimen. Withdrawal of the endoscope during the procedure is not required.

There are 2 ways to detach the S-O clip. First, the nylon loop is cut with an electro-surgical knife or scissors forceps, and it is separated from the anchor clip. In this procedure, the anchor clip remains in the body. Second, the anchor clip is pulled out with forceps, and the specimen with the S-O clip and anchor clip can be extracted from the body. In more than 50 gastric ESD cases, we have performed the latter after complete dissection on the same day, and no adverse events occurred.

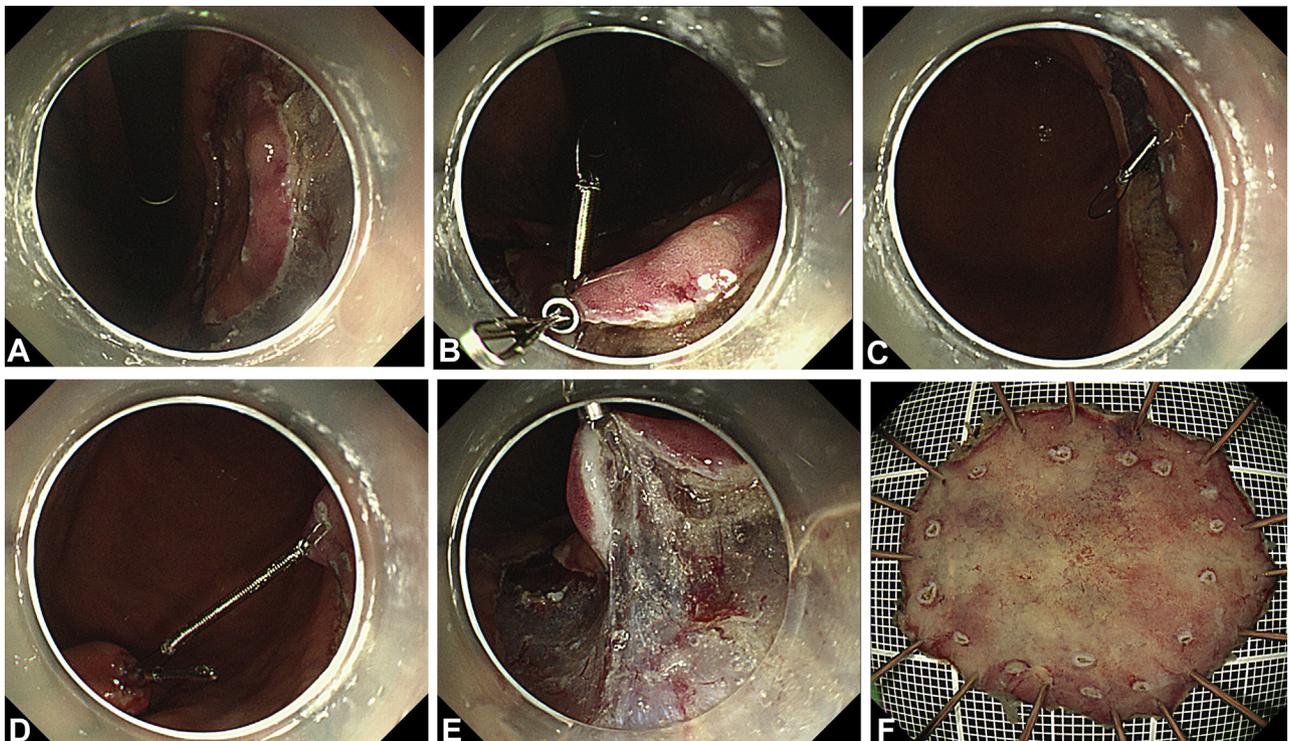
Endoscopists should be aware of the difference between the retroflexed position (Fig. 2A) and the forward position (Fig. 2B). The problems of the S-O clip are its technical difficulty during attachment and interference with the endoscope in the retroflexed position. The countermeasures for these problems are as follows.

### USE OF THE S-O CLIP IN RETROFLEXED POSITION (VIDEO CASE 1)

Figure 3 shows the modified attachment method using an S-O clip in the retroflexed position. After separation of the lesion from the peripheral mucosa, the movement of the endoscope axis during submucosal dissection in the retroflexed position was confirmed (Fig. 3A). The direction of spring extension was decided, avoiding interference with the endoscope axis. The anchor site was marked with the electro-surgical knife. The S-O clip was attached on the anal side of the lesion in the direction that the nylon loop comes over the mucosa, which makes it easy to hook the nylon



**Figure 2.** Depending on the direction of the endoscope, operators should be aware of interference between the endoscope axis and spring. **A**, The spring may interfere with the endoscope in the retroflexed position. The S-O clip should be anchored on the site where the spring does not interfere with the endoscope axis. **B**, Interference between the endoscope axis and spring during submucosal dissection rarely occurs in the forward position, unlike in the retroflexed position.



**Figure 3.** S-O clip-assisted gastric endoscopic submucosal dissection in the retroflexed position. **A**, After separation of the lesion from the peripheral mucosa, the movement of the endoscope axis during submucosal dissection in retroflexed position is confirmed. **B**, The S-O clip is attached on the anal side of the lesion in the direction that the nylon loop comes over the mucosa. **C**, It is easy to hook the nylon loop with an anchor clip because the nylon loop comes over the mucosa. **D**, The S-O clip is anchored on the opposite side of the lesion in the forward position. **E**, Good visualization of the submucosa and adequate traction are obtained with extension of the spring. **F**, Complete en bloc resection is achieved, and there is no damage to the specimen due to the S-O clip.

loop by the anchor clip (Figs. 3B, 3C). The S-O clip was anchored in the forward position, confirming the mark (Fig. 3D). The endoscopic position was changed to the retroflexed position carefully, so as not to sling over the

spring. Finally, the submucosal dissection was started with good visualization (Fig. 3E), avoiding interference between the endoscope and spring. No damage to the specimen caused by the S-O clip was found (Fig. 3F).

## USE OF S-O CLIP IN FORWARD POSITION (VIDEO CASE 2)

In ESD for the upper- or middle-third of the stomach, submucosal dissection is basically performed in the retroflexed position because it is difficult to turn the mucosal flap with a hood, owing to the movement of the lesion caused by the patient's respiration in the forward position. However, the S-O clip helps in turning over the mucosal flap so that it becomes easy to approach the submucosa, even in the forward position.

After separation of the lesion from the peripheral mucosa, the S-O clip was attached on the oral side of the lesion. It is better to attach the S-O clip in the direction in which the nylon loop comes over the mucosa because it simplifies hooking of the nylon loop by the anchor clip. Interference between the endoscope axis and spring during submucosal dissection rarely occurs in the forward position. Therefore, if the lesion is located on areas where the endoscope cannot reach, or if the endoscope is opposite the muscle layer in the retroflexed position, submucosal dissection by use of the S-O clip in a forward position should be selected.

### DISCLOSURE

*The author disclosed no financial relationships relevant to this publication.*

*Abbreviation: ESD, endoscopic submucosal dissection.*

### REFERENCES

1. Oka S, Tanaka S, Kaneko I, et al. Advantage of endoscopic submucosal dissection compared with EMR for early gastric cancer. *Gastrointest Endosc* 2006;64:877-83.

2. Rösch T, Sarbia M, Schumacher B, et al. Attempted endoscopic en bloc resection of mucosal and submucosal tumors using insulated-tip knives: a pilot series. *Endoscopy* 2004;36:788-801.
3. Imaeda H, Hosoe N, Ida Y, et al. Novel technique of endoscopic submucosal dissection using an external grasping forceps for superficial gastric neoplasia. *Dig Endosc* 2009;21:122-7.
4. Suzuki S, Gotoda T, Kobayashi Y, et al. Usefulness of a traction method using dental floss and a hemoclip for gastric endoscopic submucosal dissection: a propensity score matching analysis (with videos). *Gastrointest Endosc* 2016;83:337-46.
5. Yoshida N, Doyama H, Ota R, et al. Effectiveness of clip-and-snare method using pre-looping technique for gastric endoscopic submucosal dissection. *World J Gastrointest Endosc* 2016;8:451-7.
6. Tsuji K, Yoshida N, Nakanishi H, et al. Recent traction methods for endoscopic submucosal dissection. *World J Gastroenterol* 2016;22:5917-26.
7. Sakamoto N, Osada T, Shibuya T, et al. Endoscopic submucosal dissection of large colorectal tumors by using a novel spring-action S-O clip for traction (with video). *Gastrointest Endosc* 2009;69:1370-4.
8. Ritsuno H, Sakamoto N, Osada T, et al. Prospective clinical trial of traction device-assisted endoscopic submucosal dissection of large superficial colorectal tumors using the S-O clip. *Surg Endosc* 2014;28:3143-9.
9. Sakamoto N, Osada T, Ritsuno H, et al. Endoscopic submucosal dissection of colorectal tumors using a traction device called the S-O clip. *Gastroenterological Endoscopy* 2017;59:1514-23.

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