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A “clip–thread–elastic ring” internal traction device for endoscopic submucosal dissection of a duodenal tumor

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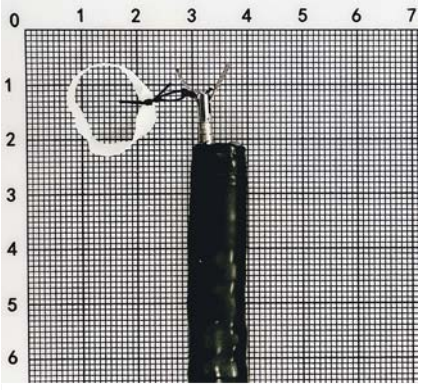
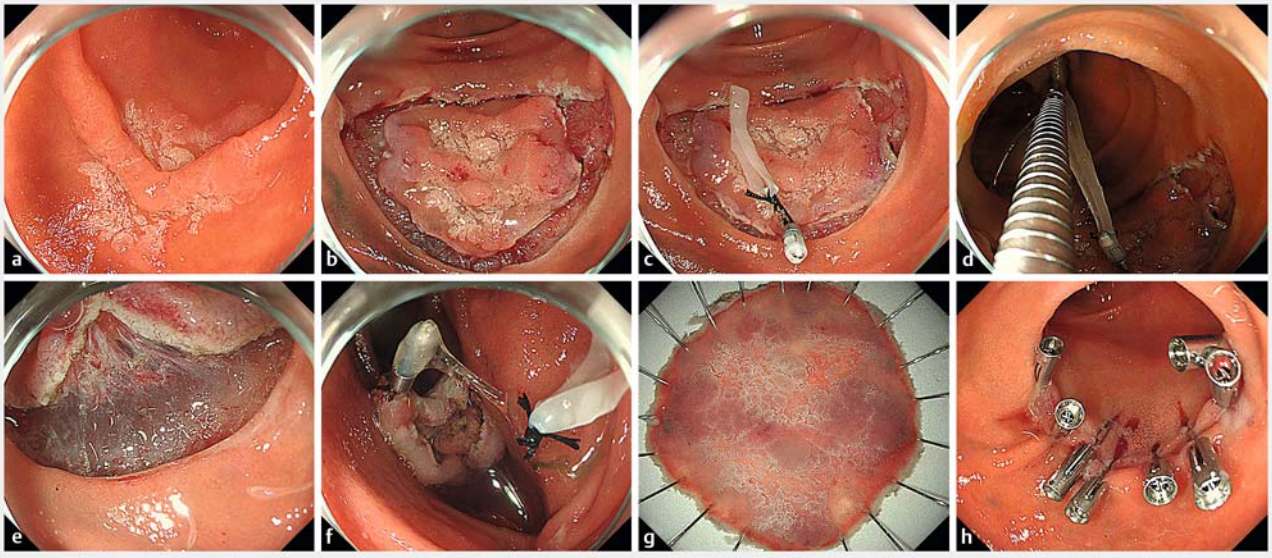
Duodenal endoscopic submucosal dissection (ESD) is one of the most challenging procedures. We developed a “clip–thread–elastic ring” internal traction device to facilitate ESD procedures in the duodenum (▶ **Fig. 1**). The device consists of an endoscopic clip, a surgical thread, and an elastic ring cut with scissors from a commonly used sterile glove. Herein, we report the application of this device to facilitate an ESD procedure in a 52-year-old man with a flat tumor in the descending duodenum (▶ **Fig. 2a**; ▶ **Video 1**).



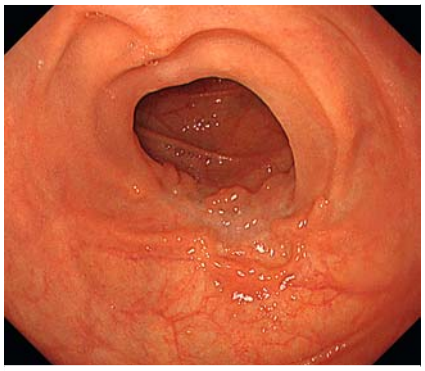
▶ **Fig. 1** Photograph of the “clip–thread–elastic ring” internal traction device, which consists of an endoscopic clip, a surgical thread (type 3–0, 5 mm in length), and an elastic ring that is 15–20 mm in diameter and 3 mm in width.

Submucosal injection and circumferential incision were performed around the tumor as per the normal procedure. Because the submucosal layer was inadequately exposed (▶ **Fig. 2b**), the “clip–thread–elastic ring” internal traction device was applied. The endoscopic clip of the device was tightly attached to the oral margin of the tumor (▶ **Fig. 2c**). Subsequently, the elastic ring was attached to the contralateral normal duodenal mucosa using another endoscopic clip (▶ **Fig. 2d**), achieving adequate exposure of the submucosal layer and the cutting line (▶ **Fig. 2e**). Precise dissection was therefore performed, with the tumor being resected en bloc. The specimen was easily removed by cutting the thread between the endoscopic clip and the elastic ring (▶ **Fig. 2f**). No mucosal damage was detected in the specimen (▶ **Fig. 2g**), or on the contralateral normal duodenal mucosa. The mucosal defect was closed with several endoscopic clips (▶ **Fig. 2h**). A repeat endoscopy after 3 months confirmed healing of the wound (▶ **Fig. 3**).

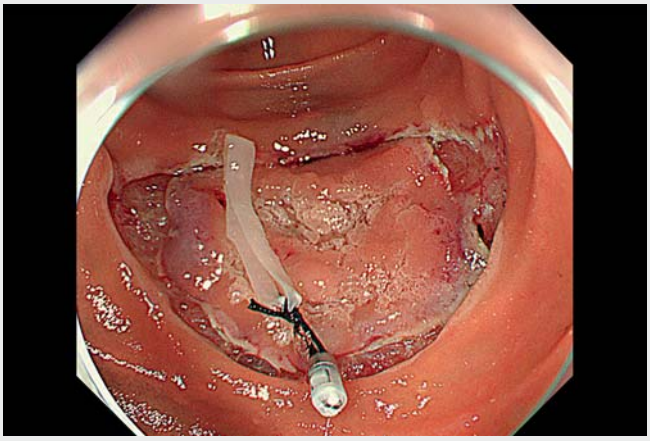
Our experience demonstrates that the “clip–thread–elastic ring” internal traction device we have developed can be safely and effectively used to facilitate duodenal ESD procedures. The traction force of this device can be easily adjusted by inflation or inspiration, and no other hands are needed during the whole procedure. The risks of mucosal damage and



▶ **Fig. 2** Endoscopic images showing: **a** a flat tumor in the descending duodenum; **b** the inadequately exposed submucosal layer after submucosal injection and circumferential incision; **c** the endoscopic clip of the device attached at the oral margin of the tumor; **d** the elastic ring attached to the contralateral normal duodenal mucosa; **e** adequate exposure of the submucosal layer and the cutting line after placement of the traction device; **f** the thread between the endoscopic clip and the elastic ring is cut to remove the specimen; **g** macroscopic appearance of the intact specimen, which had no mucosal damage; **h** closure of the mucosal defect using endoscopic clips.



▶ **Fig. 3** Image from a repeat endoscopy after 3 months showing the well-healed wound.



Video 1 A "clip–thread–elastic ring" internal traction device is used to facilitate an endoscopic submucosal dissection procedure for a flat tumor in the descending duodenum.

device detachment are low. In addition, the device can be assembled from commonly used instruments, so is suitable for widespread application in clinical practice.

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Competing interests

The authors declare that they have no conflict of interest.

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