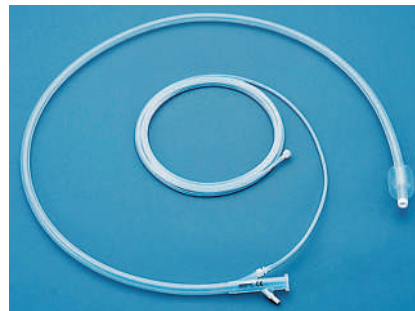


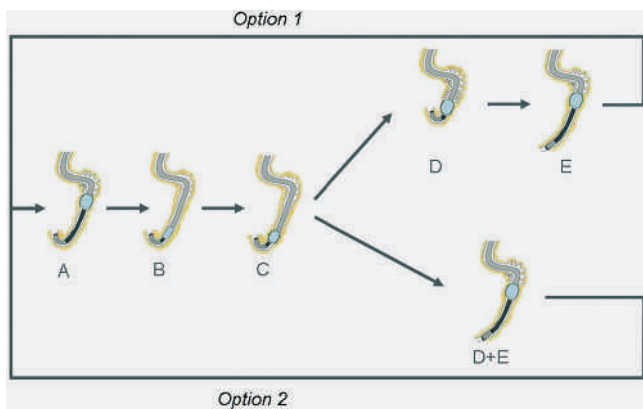
## Balloon-assisted enteroscopy using a single-balloon technique



**Fig. 1** Single-balloon enteroscopy (XSIF-Q160Y)



**Fig. 2** Overtube (XST-BY3A)



**Fig. 3** Insertion options. Option 1: 'Pull first, then push' (conventional). Option 2: 'Pull and push simultaneously' (simplified).

The prototype of the single-balloon enteroscopy system (Olympus Medical Systems Europa GmbH, Hamburg, Germany; **Fig. 1**) consists of a high-resolution endoscope (XSIF-Q160Y) with a working length of 200 cm, and an outer diameter of 9.2 mm, and a flexible overtube (XST-BY3A; **Fig. 2**) with a working length of 132 cm and an outer diameter of 13.2 mm. A latex-free balloon is only attached at the tip of the single-use silicon overtube, and is inflated and deflated with air from a pressure-controlled pump system (Olympus balloon control unit MAJ-1440).

The balloon on the tip of the overtube is deflated at the start of the procedure, until the duodenum is reached. The balloon is then inflated to maintain a stable position, and the enteroscope is inserted as far as possible. After this, the tip of the enteroscope is angled (and hooked behind a fold if possible) to achieve a stable position of the distal tip. Now the overtube

balloon is deflated and inserted along the enteroscope until the tip of the enteroscope is reached. The overtube balloon is then inflated again. At this position (**Fig. 3**) there are two options to further thread the endoscope into the small bowel:

1. Both the enteroscope and the overtube are pulled back in order to shrink the bowel. Following that, as an additional maneuver, the endoscope is once again threaded into the bowel.
2. The angulation is used to find the lumen of the bowel and then the overtube is pulled back and simultaneously the enteroscope is pushed forward into the lumen. In a two-examiner setting, this works best if one examiner is controlling the insertion tube plus overtube, and at the same time the other examiner controls the angulations in such a way that the distal tip always points into the free lumen.

The two options for threading the overtube into the small bowel can be combined. In comparison with enteroscopy using the double-balloon technique, this newly developed single-balloon enteroscopy seems to be easier to perform and saves time.

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