

# ADVANCES IN ENDOSCOPY

Current Developments in Diagnostic and Therapeutic Endoscopy

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## Tips and Tricks for Success With Endoscopic Clips



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### **G&H** Could you provide an overview of the various types of endoscopic clips?

**KM** The main types of endoscopy clips are categorized as clips placed through the working channel of the endoscope, or through-the-scope clips (TTSCs), and clips placed on top of the endoscope, called over-the-scope clips (OTSCs). Most, if not all, hemostatic clips available in the market now are made of nonferromagnetic materials (eg, nitinol, tantalum, and titanium), which have the advantage that they are not heated or attracted by magnetic resonance imaging or magnetic resonance tomography (MRT). This is a common concern of clinicians and patients because clips, once they are placed, tend to stay attached for a couple of days, sometimes weeks, and in some cases, up to years. In general, they are safe, and there are no reports of clips causing damage during MRT.

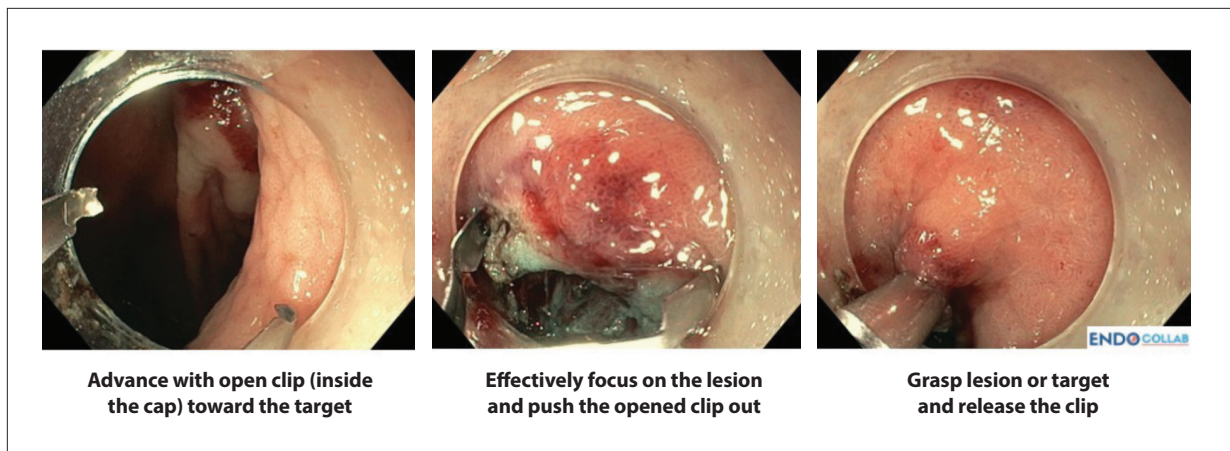
The mechanism of action is compression to facilitate apposition of tissue using the clip's 2 arms, sometimes called hands, which are attached to a stem. The arms and stem, the main anatomical aspects of TTSCs, form the shape of a Y. The tips of the arms may be curved or have little hooks or are angled about 45 degrees to allow for catchment of tissue. Some newer clips have very wide arms (eg, the MANTIS clip, Boston Scientific), which can close larger defects, such as perforations or leaks. Most clips have a stem of approximately 8 to 9 mm, which generally works well; however, for some areas, such as inside the esophagus, large stems can rub the opposing esophageal wall. Therefore, the choice of clip needs to be based on the anatomic area where one is working. In the esophagus, I use clips with short stems. When closing a large defect, I use clips with long arms or several clips with shorter arms.

The OTSC is different in that it looks like a bear trap that is delivered through a cap placed on top of

the endoscope. There are 2 types of OTSCs—one from Ovesco, the most commonly used clip worldwide, and another from STERIS. The Ovesco clip comes in various shapes and sizes. The bear trap design allows for a higher catchment area, has greater opposition forces, and often, especially in bleeding ulcers or lesions that have a visible vessel, can be the only therapy. It is used as a one-and-done monotherapy, which is a new trend. For me, it has been a revolution in therapeutic endoscopy and one of the major inventions in the last 15 years.

### **G&H** How have innovations in clip technology advanced endoscope utility?

**KM** Up until the 1970s, endoscopy was essentially a diagnostic tool. Then, Professor Nib Soehendra, a master of endoscopy from Germany, came up with the idea of injecting ulcers to stop bleeding. He was also one of the pioneers who used the first TTSCs. The realization that endoscopic compression of a vessel could stop bleeding was a major innovation. Nonetheless, for the next 30 years, the international standard among societies for treating upper gastrointestinal (GI) bleeding was to perform dual therapy with injection and clipping, burning and clipping, or injection and burning. However, this standard changed with the introduction of the OTSC, and as endoscopists found that the OTSC was easy to place even in difficult positions, that it was useful even for fibrotic ulcers for which traditional clips (TTSCs) cannot be placed, and that an OTSC could achieve hemostasis in one session. At first, the OTSC was used mainly as rescue therapy, but then 2 large studies were published that showed the OTSC to work well as monotherapy and was equivalent to or better than dual therapy. The OTSC has been a real revolution also in terms of its impact on procedure duration, safety, and cost because, for example,



**Figure 1.** Placement of a clip with assistance of a cap for hemostasis. Figure courtesy of EndoCollab.

bleeding that once required 5 to 7 traditional clips can now be managed with one OTSC.

**G&H** In general, what are the indications for endoscopic clip use?

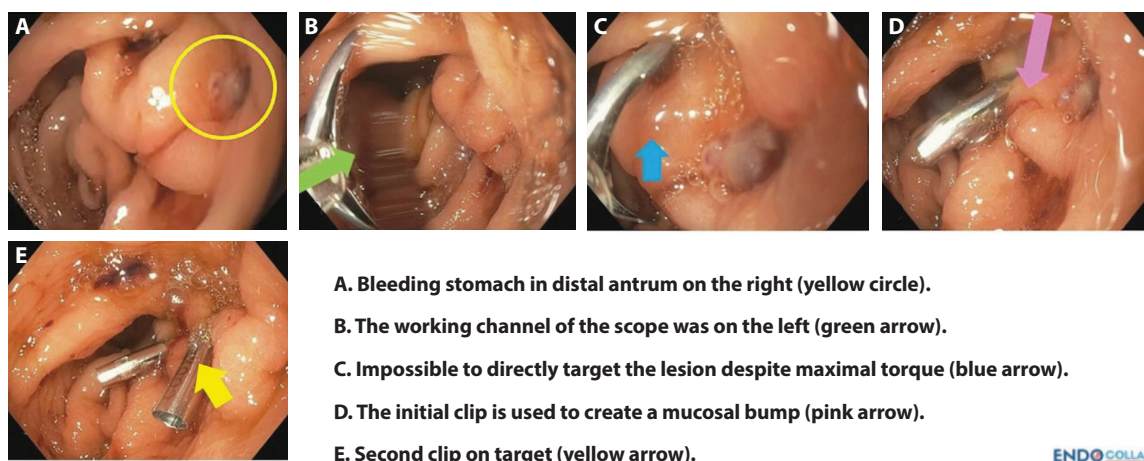
**KM** The general indications for endoscopic clips include therapy for bleeding ulcers and Dieulafoy lesions—even diverticular bleeding can be treated with these clips—Mallory-Weiss tears, and so on. Endoscopic clips can be useful for angiodysplasias when burning is not enough, and sometimes using monotherapy with a TTSC is sufficient. Another indication for clips is the closure of defects such as lacerations, perforations (spontaneous, those induced by equipment, procedures, or operative injury), and fistulas. The clips can be used to anchor stents or devices such as nasoduodenal feeding tubes. A little string placed on the tube can be fixed to the duodenum with a TTSC to prevent regurgitation of the tube into the stomach. For endoscopic resection procedures, clips are often used for prophylactic closure of the defect. With more aggressive endoscopic procedures such as endoscopic submucosal dissection (ESD) being performed, more prophylactic closure is required. Studies have shown that after performing polypectomies in the right colon, clipping of the lesion is useful, or for a polyp with a big stalk that may bleed, prophylactic clipping before or after resection can be done. Clips are also used to close a mucosal incision during certain third-space endoscopy procedures, such as peroral endoscopic myotomy (POEM) and gastric POEM.

**G&H** Do you have a strategy for clip selection? How do you choose the right clip for the right job?

**KM** As discussed, for the esophagus, especially the upper esophagus, close to the upper esophageal sphincter, I prefer to use clips with a shorter stem. For a large lesion, the MANTIS clip works well because it can be expanded more than other clips. When I anticipate using 2 clips to close a defect, perforation, or postresection area (eg, after a right colonic resection), I like to use an Instinct Plus clip (Cook Medical) because of its very high strength forces. Such a clip is useful in situations where a clip may come loose or where the clip needs to be really tight. In the United States at Carilion Roanoke Memorial Hospital, we have 3 types of clips; however, other hospitals may not have multiple clip options. For endoscopists who have access to only one clip and are working on a defect that would likely be better closed with a broader clip, then my advice is to focus on the defect but not near where the area is widest, rather start at the edge and approximate, so that the closure area becomes smaller, and use the width of the arms expanded by the clips in the best possible way. Otherwise, the endoscopist might end up losing the clip, which can happen if he or she tries to hook on one side and then twist and hook the other side. My approach is to go from one edge and just make the wound smaller, and that results in a safer and more efficient closure.

**G&H** Could you share some technical tips and tricks for effective clip deployment and how to avoid misfires and premature release?

**KM** Lesions in the duodenum area, especially in the posterior duodenum where bleeding gastroduodenal artery ulcers are often found, can be very difficult to close with TTSCs. For this situation, I tend to use the OTSC because I can move the endoscope to various parts of the endoluminal GI tract and position the cap where the clip is



**Figure 2.** The bump trick for hemostasis. Figure courtesy of EndoCollab.

attached to face the direction of the perforation, ulcer, or lesion I want to engulf. For upper GI bleeding, the OTSC has been helpful, even as first-line (not just as rescue) therapy because it is quick and efficient.

Those who may not have OTSCs or who mainly use TTSCs can try switching to a pediatric colonoscope to close or approach an ulcer in the posterior duodenum. Because the working channel of the endoscope is generally on the left, switching to a pediatric colonoscope that has a working channel on the right will allow placement of the TTSC into the posterior duodenum.

Another important tip I teach my fellows is what to do when they have the endoscope in the second duodenum, or at the curve of the bulb and second duodenum, and are about to advance a TTSC, but the clip does not release because it is twisted from angulation. There are clips from STERIS that can go out of the endoscope in a retroflexion or angulated position, which are good clips to have in any unit. However, for those who are using a traditional clip, my trick is to place a distant transparent cap on the endoscope. This cap is generally used for ESD, but we use it for many different procedures, especially for placing clips (Figure 1). Having this cap in the emergency cart is essential. (It is different from the caps used for removal of foreign bodies that tend to be larger.) Once in the antrum, the endoscopist can deploy the clip. The assistant should not close it. The clip is kept open and then pulled with the right hand into the tip of the cap, which will automatically semi-close the clip. Now, there is no problem proceeding to the lesion because the clip is no longer twisted and ready to be fired from inside the cap. The beauty is that this cap works the same as an OTSC. Once in the lesion, the endoscopist just needs to push the

clip a little bit. At that moment, the assistant closes the clip. This is a quick and effective procedure for situations that can appear desperate.

#### **G&H** What are your best practices for clip placement and optimal positioning?

**KM** For actively bleeding lesions, when it is clear that the TTSC will not stay on top of the lesion because the intestine is moving or either the patient or the clip is not in an ideal position, the endoscopist can try placing the clip slightly distal to the lesion (Figure 2). This is done for 2 reasons: localization and guidance. Even if the clip cannot be placed on the bleeding lesion, at least the radiologist can see it during interventional angiography and is able to locate the lesion. Clipping a little distally to the lesion creates a bump that can be used as a guide to facilitate placement of the next clip in a better position to target the bleeding lesion. This helps to avoid missing the lesion.

#### **G&H** How do you approach challenging locations?

**KM** For challenging locations such as a tortuous colon or positions where the clip cannot be pushed through the endoscope such as in retroflexion, and there is GI bleeding from the cardia, either use clips with a thinner diameter shaft (eg, STERIS or Micro-Tech clips) that can be advanced in a retroflexion position or change to an endoscope with a larger working channel. When working in the cardia, having a therapeutic gastroscope with a 3.2-, 3.4-, or 3.8-mm working channel would be helpful. Those who lack the training or experience with these endoscopes can

advance the clip into a standard endoscope with a 2.8-mm channel until it is almost at the tip; then during endoscopy when at the area that needs clipping, pushing the clip the final 2 or 3 cm out of the endoscope is easy because the clip is already inside.

Another trick to try in the colon, especially during deep enteroscopy, is to utilize the overtube. The endoscopist leaves the overtube in place, brings the endoscope out, loads the clip into the endoscope, and then goes through the overtube, which is now like a giant working channel connecting the outside world through the anus to the area of interest, perhaps the cecum. Going through the overtube with the clip loaded on the endoscope makes traveling through challenging locations much easier.

### G&H How do endoscopic clips compare with other modalities?

**KM** The beauty of the clips is that they appose tissue. Therefore, they not only treat bleeding but also close a potential defect. With thermal modalities, there is the risk of immediate or delayed perforation. One needs to be quite careful when applying heater probe or argon plasma coagulation, even if the ulcer is deep, because sometimes there can be transmural damage. During monopolar or bipolar coagulation, part of the strategy is to apply force to the area being burned, and I have witnessed cases that ended up in perforation. It is important to be gentle and not apply too much pressure on areas where one is unsure of their exact location in the GI tract. For the strategy of injection and clip or heater probe combination, sometimes injecting normal saline or saline mixed with epinephrine in a 1:20,000 dilution to create initial hemostasis helps provide a clear working field, as the epinephrine will not cause any hemostasis long term. Injecting saline or a mix of saline acts like a safety cushion to prevent deep perforation during heat or clip application.

Some studies are showing that clips are safer and more efficient than other therapies, which is why clips are mainly used. In some cases, heat therapies are tried (eg, for very fibrotic lesions). In Europe, including in Germany, fibrin glue is still used, although it is expensive, is associated with minimal risk of transmitting unknown viruses or infections, and needs to be kept refrigerated, which is not that practical to have in the emergency cart. However, fibrin is a good hemostatic therapy for bleeding ulcers.

### G&H What are the future directions and emerging uses of endoscopic clips?

**KM** OTSCs are now available in sizes ranging from 11 to 14 mm. The 11-mm mini-OTSCs can be very useful for small vessels or for Mallory-Weiss lesions and are easier to

advance through the upper esophageal sphincter of elderly patients who tend to have a smaller esophagus diameter. Another important development is the use of modified TTSCs as traction devices. During ESD, the endoscopist can fashion a homemade traction device by cutting elastic bands or using orthodontic bands. One colleague from China cut a glove tip into rings to make elastic bands to use as traction with TTSCs. Essentially, anything that can be pulled as elastic can be used as a traction device. The band is placed on top of the clip that is attached to the polyp, and then another clip is used to pull the elastic band and attach it to the contralateral wall. This tension enables the endoscopist to work on resecting the polyp. There are now commercially available clips that come with elastic bands or with expandable bands, even some with 3 or 4 hooks, and can be used as traction devices. In a similar vein, clips are being used in a multi-elastic band traction to close very large defects by pulling the center together. In the future, more ideas from a toolbox approach will likely become engineered and commercialized for practicality and ease of use.

### Disclosures

*Dr Mönkemüller is Founder of EndoCollab, has served as a consultant for Cook Medical (United States) and Ipsen (France), and is a board member of Ovesco Endoscopy (Germany and United States).*

*The views expressed in this column are solely those of the author and do not necessarily represent the opinions of any affiliated organizations or institutions. References to specific products or services are for informational purposes only and do not imply endorsement.*

### Suggested Reading

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