

# Closure of Temporary Loop Colostomy or Ileostomy

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## Indications

A temporary ostomy can be closed when it is no longer needed. Wait a minimum of 6–12 weeks after creation of the stoma to allow for the adhesions to soften. Never close an ostomy before evaluating the distal gastrointestinal tract in general and particularly the distal bowel (with particular attention to the region of concern that prompted creation of the stoma). Thus, adequate healing of a distal anastomosis, fistula repair, or other type of reconstructive surgery, as well as absence of a distal obstruction and resolution of any signs of sepsis, should be demonstrated by physical, endoscopic, and radiographic examinations. Loop ostomies may be closed by the techniques described in this chapter.

## Contraindications

- Non-resolved distal pathology
- Unfavorable operability criteria
- Superobesity

## Preoperative Preparation

- Water-soluble contrast enema radiography to demonstrate patency of distal colon and integrity of a distal anastomosis
- Flexible sigmoidoscopy or colonoscopy if the radiographic result is not pristine

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- Routine bowel cleansing for colostomy takedown; clear liquid diet only for ileostomy takedown
- Enemas to cleanse the inactivated left colon segment may be required as well, particularly if residual stool or contrast is present
- Perioperative systemic antibiotics

## Pitfalls and Danger Points

- Enterotomy of stoma-bearing bowel or adjacent small bowel
- Dense peritoneal adhesions, inability to exteriorize bowel loop
- Abdominal compartment syndrome if large hernia repaired as well
- Surgical site infections
- Bowel obstruction
- Incisional hernia
- Reactivation of distal area of concern (e.g., former anastomotic leak or fistula)

## Operative Strategy

Keep in mind three key points for success with these procedures: adequately mobilize the bowel to ensure a tension-free closure or anastomosis, use well-vascularized and healthy tissue for closure, and take care not to create inadvertent bowel wall injuries.

Adequate lysis of the adhesions between the bowel and surrounding structures allows a sufficient segment of bowel to be mobilized, avoiding tension on the suture line. If necessary, the incision in the abdominal wall should be enlarged to provide exposure. If the tissue in the vicinity of the ostomy has been devascularized or injured by operative trauma, do not hesitate to resect a segment of bowel and perform an end-to-end anastomosis instead of a local reconstruction. Proper

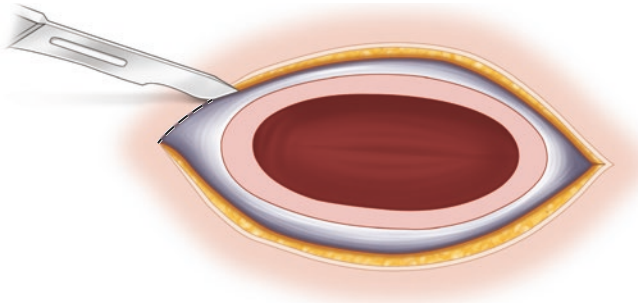


Fig. 67.1

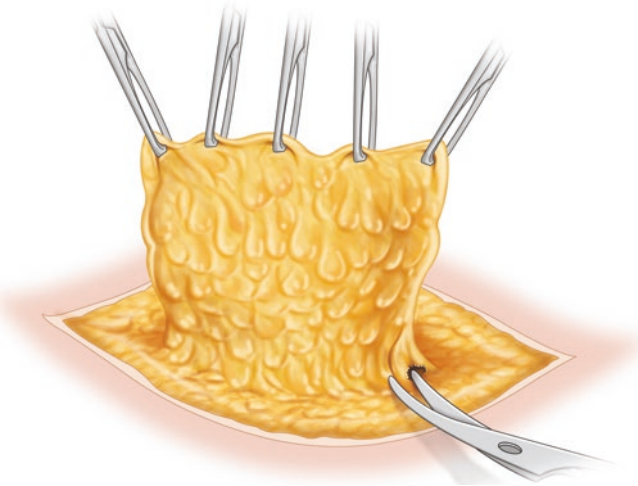


Fig. 67.2

suturing or stapling of healthy bowel wall and minimizing fecal contamination combined with perioperative antibiotics help prevent formation of abscesses.

The technical steps and methods to actually restore the intestinal continuity are the largely the same for the closure of a loop ileostomy and a loop colostomy. A stapled side-to-side (functional end-to-end) anastomosis is easy, safe, and fast and is the method of choice for closure of a loop ileostomy. However, the method creates an iatrogenic giant diverticulum, which functionally may not be a problem in the small intestine. In the colon with its more formed stool, however, it could potentially result in stool accumulation (termed “clustering”) and make subsequent colonoscopies more challenging. For that reason and in contrast to the other locations, it is our preference to do colo-colonic anastomoses in an end-to-end fashion, or sometimes in an isoperistaltic side-to-side configuration.

Infection of the operative incision is expected following colostomy closure, owing in part to failure to minimize the bacterial inoculum into the wound. Another phenomenon that contributes to wound infection is retraction of subcutaneous fat that occurs around the colostomy. This can produce a gap between the fascia and the epidermis when the skin is

sutured closed, creating dead space. Avoid this problem by leaving the skin open at the conclusion of the operation.

## Documentation Basics

Coding for surgical procedures is complex. Consult the most recent edition of the AMA’s *Current Procedural Terminology* book for details (see references at the end). In general, it is important to document:

- Indications
- Findings justifying stoma takedown
- Extent of adhesions
- Resection of bowel
- Type of anastomosis (end-to-end, side-to-side)
- Stapled or hand-sewn
- Hernia repair (with or without collagen implant)
- Wound closure or not

## Operative Technique

### Anesthesia and Positioning

General anesthesia is needed for the procedure. Place the patient in supine position unless there is a specific need to have access to the anus or left-sided colon. Always carry out a digital rectal exam prior to prepping the patient to verify patency of a distal anastomosis.

### Incision

Using a scalpel, make a transverse elliptical skin incision around the stoma that tangentially cruises along the upper and lower mucocutaneous junction at 1–2 mm distance and extends 1–1.5 cm on the sides (Fig. 67.1). Use electrocautery to stop any skin bleeders. Place Kocher or Allis clamps to each of the lateral skin tongues, potentially also from the upper to the lower lip, and gently lift them up.

Deepen the incision with the cautery until the seromuscular layer of the bowel. Switch to fine Metzenbaum scissors, and separate the bowel wall from the subcutaneous fat with meticulous sharp dissection (Fig. 67.2). Take care not to injure the bowel wall. Continue down to the point where the bowel meets the anterior rectus fascia.

### Fascial Dissection

Continue the dissection carefully and with patience. Anticipate that the anatomical layers will be distorted; often

there is a hernia sac and the fascia not immediately visible. The more difficult the dissection seems, the more you should preserve control and avoid any undue traction or blunt finger dissection, as it may create a bowel injury in the depth of the wound that (1) you may not notice or that (2) you would extremely difficult to repair. Follow the bowel wall circumferentially and dissect it off the fascial ring and muscle layer until the peritoneal cavity is entered. If the bowel was previously sutured to the fascia, do not hesitate to cut the fascia (err on the side of fascia) to release the bowel. Facilitate this dissection by placing Kocher clamps on the edge of the fascia and gently lifting it (Fig. 67.3).

### Peritoneal Dissection

Once the peritoneal cavity has been identified and partially entered, it is often possible to insert an index finger and gently expose areas with residual adhesions. For the reasons mentioned above, it is better to divide them under visual control than to bluntly free the bowel with the finger. The ultimate goal is to safely free the bowel from any abdominal wall structures, hernia sac, or peritoneal adhesions in the vicinity of the ostomy until a sufficient exteriorization of the stoma-bearing bowel segment has been achieved. You can

most commonly accomplish this through a fairly small defect in the abdominal wall.

### Strategies for the Difficult Dissection

In the event that you encounter an unexpected degree of adhesions that result in a recognized problem (e.g., enterotomy) or in serious difficulty to make any progress, keep two salvage strategies in mind:

1. Extend the incision laterally by dividing the remainder of the rectus muscle with electrocautery for a distance adequate to accomplish the dissection safely.
2. Perform a formal laparotomy and perform the lysis of adhesions from inside.

### Bowel Anastomosis

Carefully inspect the wall of the mobilized bowel for any injury. A few small superficial patches of serosal damage are of no significance so long as they are not accompanied by devascularization.

### Resection with Stapled Side-to-Side (Functional End-to-End) Anastomosis

This is the most common technique for an entero-colonic or entero-enteric anastomosis, hence also for ileostomy take-down. As long as the bowel more proximal and more distal look less traumatized, this approach allows you to discard the bowel segment that was roughed up by the dissection through the abdominal wall. Identify the level on either side where you plan to transect the bowel. Divide the mesentery up to those points, using either stepwise ligation or an energy device. Align the bowels side by side. Use scissors to create an enterotomy on either side in the part that will eventually be resected. Gently insert a cutting linear stapler (70–80 mm long). Assure that the two bowel loops meet on their antimesenteric sides and the mesentery is not caught into the stapler. Fire the stapler to create the main connection. Grasp the edges of the enterotomies with Allis clamps. Fire 1-2 reloads of the same stapler across the end below the Allis clamps. That will close off and at the same time resect the ostomy-bearing bowel segment. Alternatively, the end may be stapled closed with a noncutting linear TA stapler and manually amputated with a knife. Send the specimen to pathology. Assure that the diameter of the actual anastomosis is at least a bit larger than the smaller of the two bowel diameters. While many surgeons would stop here, it is our preferred practice to routinely oversee the staple lines with seromuscular absorbable 3/0 sutures and close the mesenteric defect.

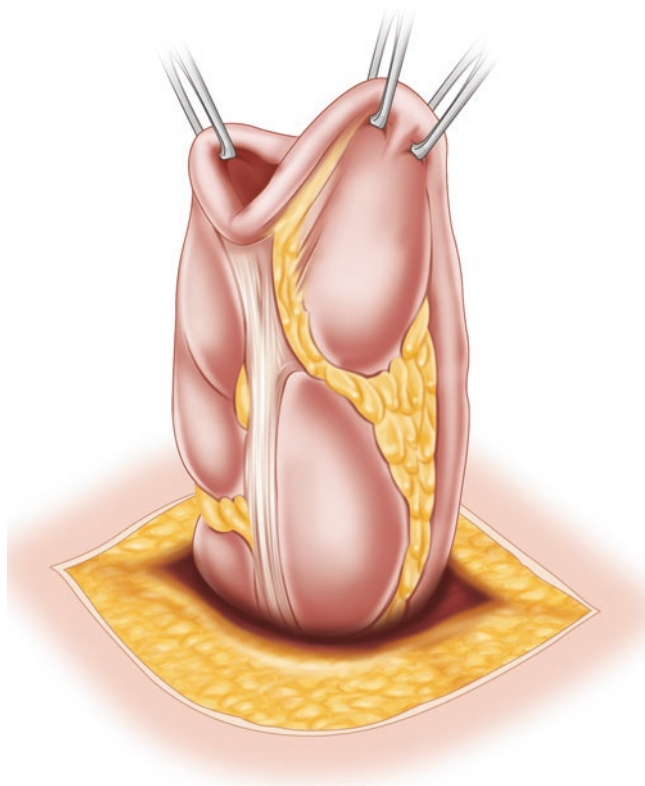


Fig. 67.3

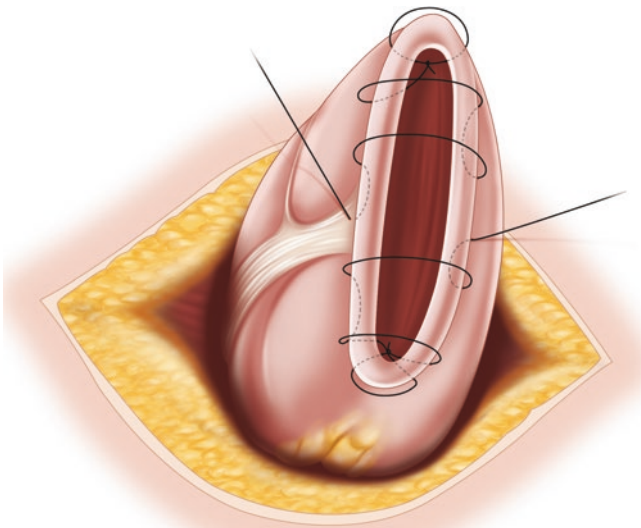


Fig. 67.4

### Simple Closure of Antimesenteric Bowel Wall Opening

This technique is commonly used for a loop colostomy take-down with healthy bowel wall in immediate proximity to the excised mucocutaneous junction. As the backwall already exists, there is no benefit in dividing the bowel and performing a full end-to-end anastomosis. If the adjacent bowel wall has a normal texture and thickness, it suffices to completely excise the skin edge that is still attached to the bowel. Close the opening in the transverse direction, carefully making sure not to narrow the lumen throughout the area. Initiate the closure by placing two seromuscular holding stitches on either end of the transverse closure and pull them in opposite direction. Close the defect from one to the other end using a common technique for bowel anastomosis (Fig. 67.4). Our own preference is to close it in two layers: the first full-thickness layer using a running absorbable monofilament 3/0 suture (PDS, polydioxanone) is placed such that the bowel wall is nicely inverted; the second seromuscular layer with interrupted 3/0 Vicryl approximates the two sides and takes off some tension from the first layer (Fig. 67.5). Make sure to avoid too excessive inversion of the bowel wall which could cause a narrowing of the anastomosis. Because of the transverse direction of the suture line, the lumen of the colon more often is quite large at the conclusion of the closure. There should be no tension whatever on this suture line.

If the colon wall is of normal consistency and the bowel lumen very large, transverse stapling is an excellent method for closing the colon defect, and the risk of an obstruction is very low. Use Allis clamps or holding stitches to align the two lips of the opening in transverse fashion (Fig. 67.6). One option is that you close the opening with two triangulated cartridges of the linear stapler

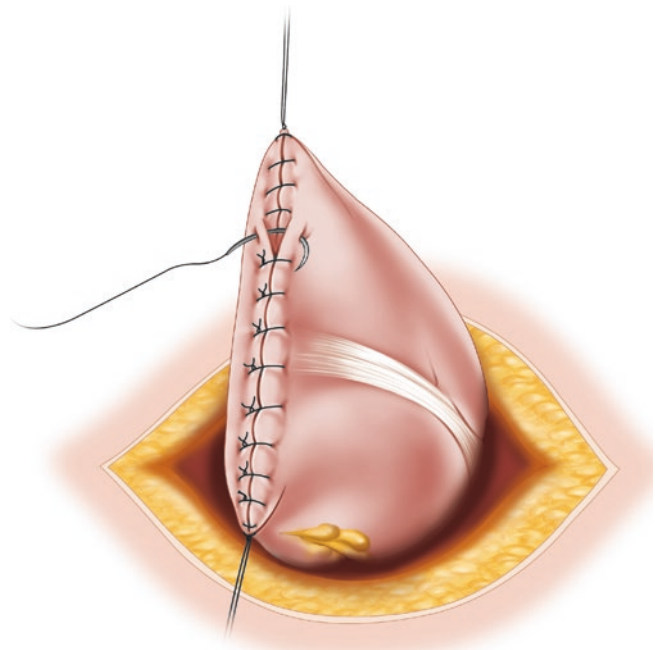


Fig. 67.5

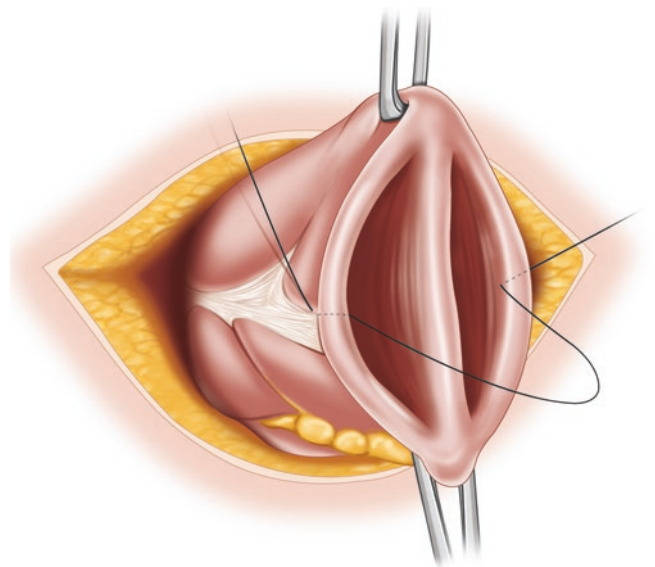


Fig. 67.6

(cutting or noncutting, Fig. 67.7); the other option is to apply a curved cutting stapler. In both settings, verify that there are no gaps and consider oversewing the staple line with an absorbable suture.

Variations of the hand-sewn technique are also applicable to a loop ileostomy with a nipple. This may come in handy, when adhesion makes it very difficult to obtain sufficient mobility to do a stapled anastomosis. As first step, you will have to undo the Brooke eversion of the nipple. Once that is achieved, you can complete the end-to-end reconnection the same steps as described above.

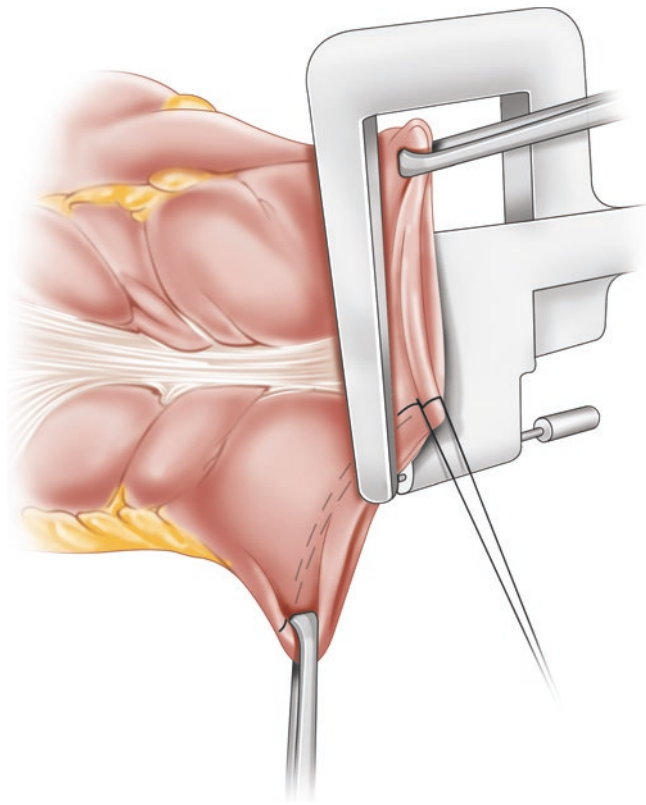


Fig. 67.7

### Resection and End-to-End Anastomosis

This technique with an end-to-end anastomosis is the method of choice for takedown of a colostomy (less common of an ileostomy) where there is a need to reconnect to separate bowel ends. That situation may arise if the tissue is of inadequate quality for a simple transverse closure or if a Prasad-type colostomy is being taken down. A stapled side-to-side (functional end-to-end) is a suboptimal configuration for a colo-colonic anastomosis.

Mobilize the bowel—if necessary by enlarging the incision in the abdominal wall or performing a formal laparotomy—and resect the nonviable bowel. Gently free up the two bowel ends without devascularizing it, and remove excessive appendages or omentum. Align the two ends and construct an end-to-end anastomosis by the usual two-layer suture technique.

### Resection and Isoperistaltic Side-to-Side Anastomosis

This technique is a hybrid form for a complete reconnection that combines the speed of stapling and avoiding the downsides of the functional end-to-end anastomosis in the colon.

Align the two staple-closed bowel ends to be conjoined in isoperistaltic fashion with a 5–6 cm overlap. Make a small enterotomy at one end of the overlap and insert the linear cutting stapler jaws to create the connection. Close the enterotomy in two layers as described in the previous section.

### Closure of Abdominal Wall

Irrigate the area. Remove residual hernia sac and dissect the subcutaneous fat off the anterior wall of the fascia for a width of 1–2 cm until a clean rim of fascia is visible all around. Assess whether to primarily close the abdominal wall defect or to address a major hernia defect by placing and securing a firm collagen sheath in underlay technique. In the latter case, position a biological mesh (collagen sheath) of adequate size on the inside of the abdominal wall closure and place a series of transfascial holding stitches under visual control. Otherwise, reapproximate the muscle layer with a few interrupted absorbable sutures, followed by a closure of the fascia layer.

### Management of Skin Wound

Frequently the colostomy can be closed without enlarging the skin incision. If a very large hernia had to be reduced and fixed as well, you may have to trim the redundant skin to avoid an unnatural folding. Closing of the wound is associated with a 20–25% incidence of wound infection. Many surgeons therefore leave the skin open for healing by secondary intention. Since 75–80% do not get infected, you might consider closing it with the plan to observe the wound carefully and open it if signs of infection develop. In both scenarios, you would manage the open wound by placing loosely packed moist gauze into the subcutaneous space to keep the tissue separated.

### Postoperative Care

- Postoperative routine antibiotics limited to 24 hours.
- Enhanced recovery after surgery (ERAS).
- Wound care: monitor closed wound for signs of infection; open if necessary. Open wound: wet-to-dry dressings, mild packing, healing by secondary intention.
- Bowel function: Previously diverted bowel (diversion colitis) may need a few weeks to months to recondition; avoid too much intervention in the first 10–14 days other than fiber supplements, afterward antidiarrheal or laxative medications as needed.

## Complications

- Anastomotic leak
- Enterotomy of adjacent bowel
- Wound abscess
- Intra-abdominal abscess or formation of entero–/colocutaneous fistula
- Bowel obstruction, prolonged postoperative ileus
- Reactivation of distal area of concern (e.g., former anastomotic leak or fistula)
- Coloanal dysfunction (incontinence, low anterior resection syndrome, outlet obstruction)
- Need for rediversion
- Incisional hernia (frequent)

## Further Reading

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