

# Ileostomy Construction

Geoffrey Scriver, MD<sup>a</sup> and Neil Hyman, MD, FACS<sup>b</sup>

Intestinal stomas continue to play an important role in the management of numerous bowel diseases. Stomas remain quite prevalent in the population, as evidenced by the fact that approximately one million people in the United States and Canada live with an intestinal stoma.<sup>1</sup> The long-term quality of life of individuals with a stoma is determined in large part by proper technique and planning around the time of operation. Often performed at the end of a long procedure, it is therefore critical that the formation of the stoma receive at least as much attention to detail as the other aspects of the operation.

Permanent end ileostomies have traditionally been used most frequently after total proctocolectomy for ulcerative colitis. With the emergence of ileal pouch-anal anastomosis (IPAA), the frequency of end ileostomy creation has declined. However, there are many patients in whom permanent ileostomy is still the preferred treatment. Patients with familial adenomatous polyposis or ulcerative colitis who have marginal sphincter function are best managed with a well-constructed end ileostomy. Many patients with these diagnoses

may simply wish to avoid the plethora of pouch specific complications that can occur with IPAA, and the quality of life of such patients appears to be roughly equivalent to those undergoing IPAA.<sup>2</sup> In addition, patients who require urgent ileal or colonic resection in whom anastomosis would be unsafe may benefit from an ileostomy. It should be noted that when a temporary ileostomy is created in this setting, they would often turn out to be permanent.<sup>3</sup>

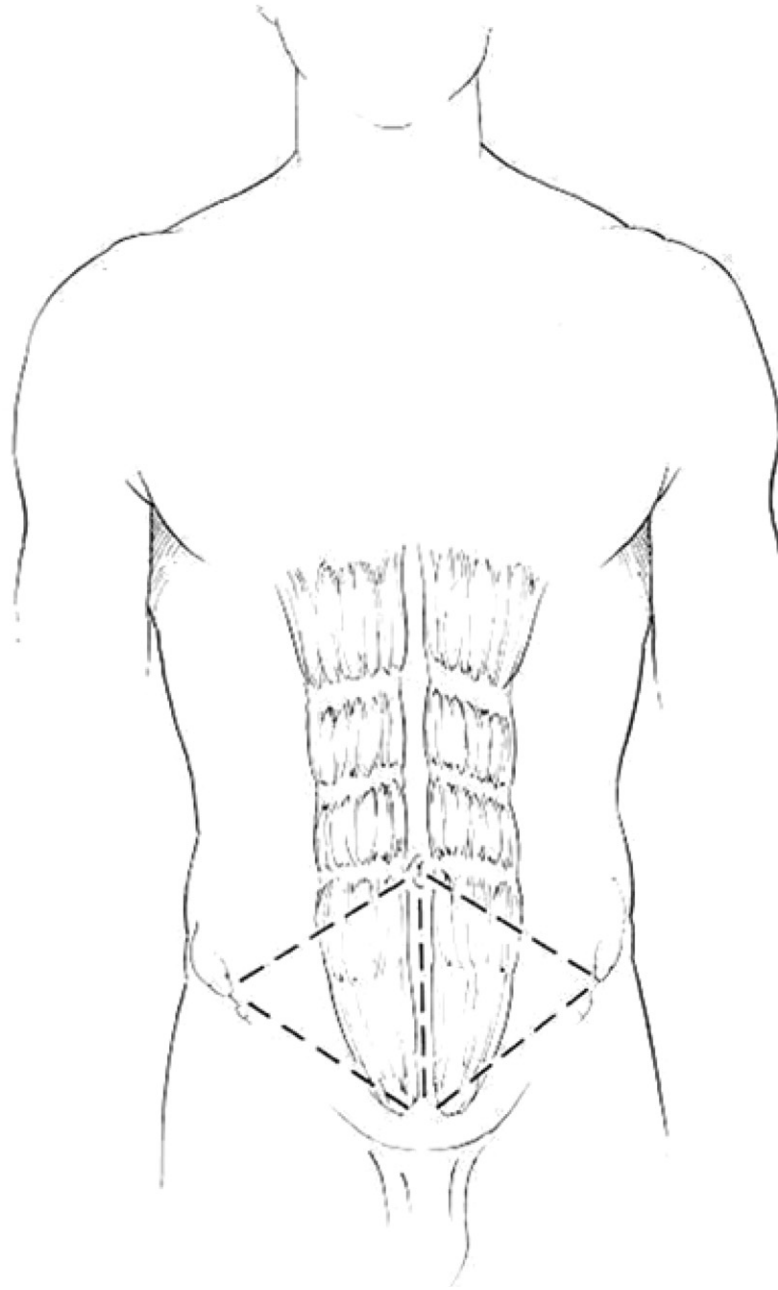
If possible, careful preoperative planning should take place. This includes discussion with the patient regarding the possibility of stoma creation and surgical alternatives. An enterostomal therapist, if available, should meet the patient preoperatively to begin discussions of living with an ostomy. Preoperative stoma marking and education by an enterostomal therapist improves postoperative quality of life.<sup>4</sup> Meeting with other patients who already live with an ostomy can provide immense emotional support for patients undergoing a planned procedure that includes ileostomy formation.

Many complications can be avoided by taking the time to find the most appropriate location on the abdominal wall. The best location is on a flat section of skin that avoids skin creases or surgical scars, the umbilicus, bony prominences, and one that the patient can see.<sup>3</sup> The beltline should be avoided. If possible, the patient should be observed while sitting and standing to ensure that no new skin creases interfere with the planned ostomy site.

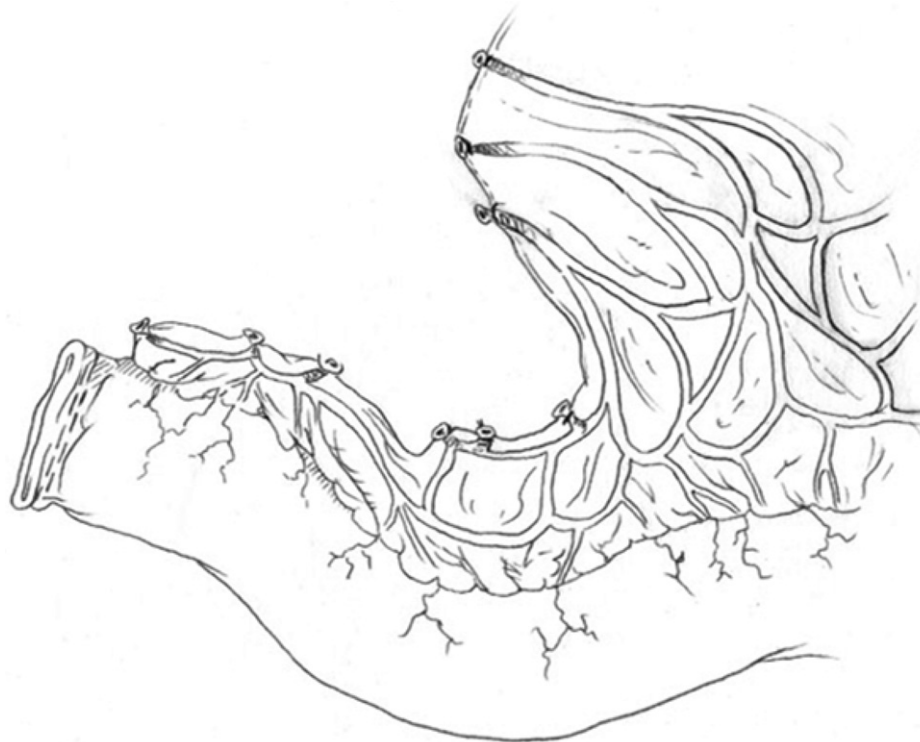
From the <sup>a</sup>Department of Surgery and the <sup>b</sup>Division of General Surgery, University of Vermont College of Medicine, Burlington, VT

Address reprint requests to Neil Hyman, MD, FACS, Department of Surgery, Medical Center Hospital of Vermont, Fletcher 301, University of Vermont College of Medicine, 111 Colchester Avenue, Burlington, VT 05401. E-mail: Neil.Hyman@vtmednet.org

## Operative Technique



**Figure 1** The “ostomy” triangle is shown. Positioning the ileostomy within one of these triangles is generally the optimal location. The three points of the triangle are the umbilicus, the anterior superior iliac spine, and the pubic symphysis. The ostomy should come through the fibers of the rectus abdominis. In obese individuals, it is occasionally not possible to place the ostomy in the lower abdominal quadrants, and the upper abdomen is a better location. (Reprinted with permission.<sup>1</sup>)

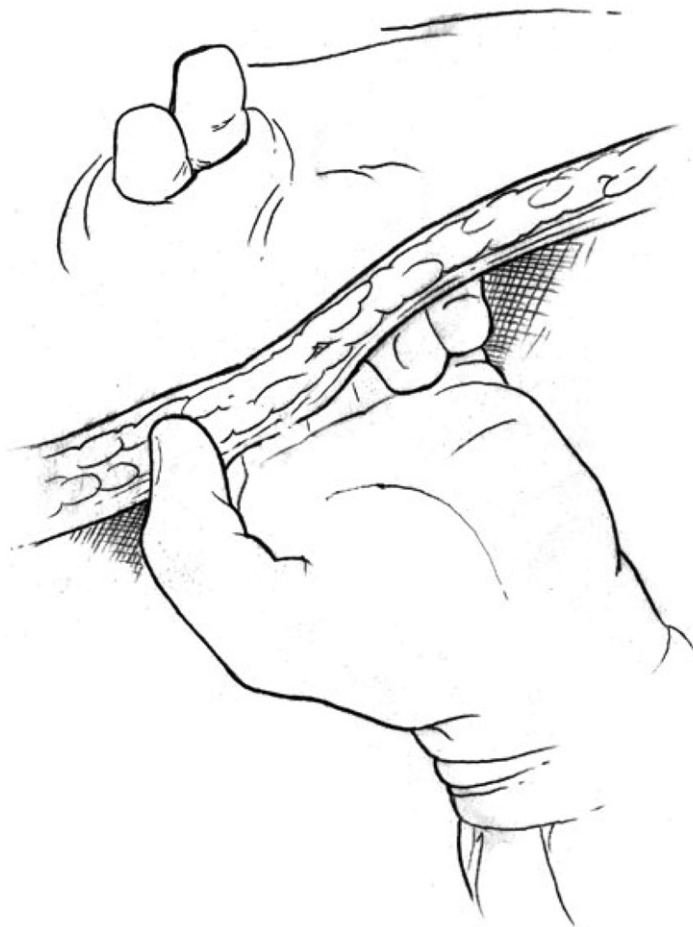
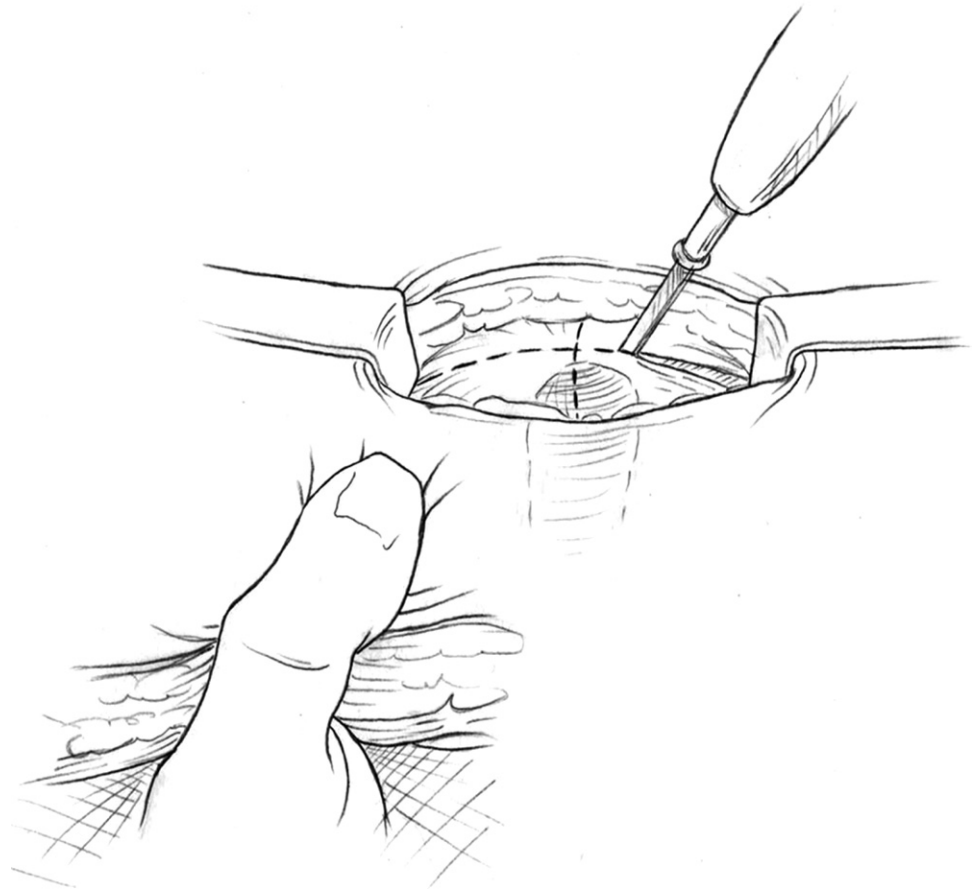


**Figure 2** The mesentery of the ileum should be ligated as shown, so that the small blood vessels that parallel the ileum are preserved. These vessels usually course within 1 cm of the ileum. This provides the blood supply to the stoma, and will help to prevent stomal ischemia. (Reprinted with permission.<sup>3</sup>)

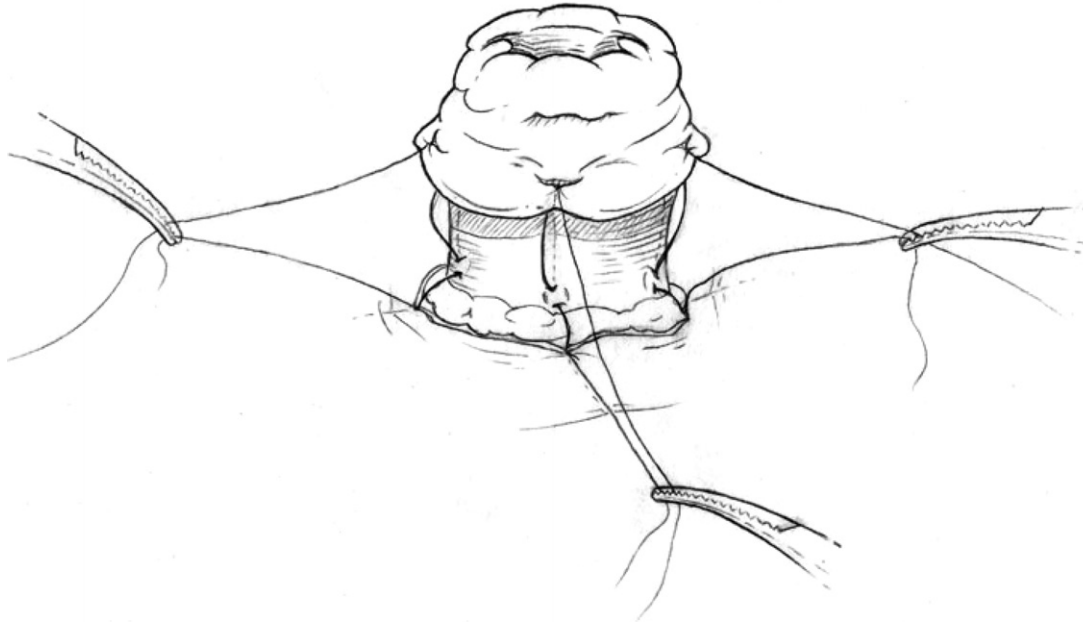


**Figure 3** The skin is grasped and a circular incision is made with either electrocautery or scalpel. A disc of skin approximately 2.5 cm in diameter is excised (about the size of a quarter). The subcutaneous fat should be preserved to help support the stoma. Note that elevating the abdominal wall from inside the peritoneum with the surgeon's nondominant hand can help with exposure, as well as protect underlying viscera during the dissection. (Reprinted with permission.<sup>3</sup>)

**Figure 4** A vertical incision is made in the anterior rectus sheath of 3 to 4 cm. Then horizontal incisions of approximately 1 cm are made to form a cruciate incision. Small retractors are used to facilitate exposure. Again, the nondominant hand is supporting the abdominal wall from inside the peritoneum, ensuring that the underlying viscera are protected from the dissection. (Reprinted with permission.<sup>3</sup>)



**Figure 5** The incisions in the fascia of both the anterior and posterior rectus sheath should be large enough to accommodate two fingers. This approximates the diameter needed to support the ileostomy without compromising blood flow. (Reprinted with permission.<sup>3</sup>)



**Figure 6** The initial sutures used to evert the stoma are shown here. Absorbable suture is used, and the suture includes the full thickness of the bowel at the open end of ileum, a seromuscular bite approximately 3 to 4 cm from the open end of ileum, and the dermis. The suture should not include the epidermis. Note that all sutures are clamped before tying. (Reprinted with permission.<sup>3</sup>)

In general, ileostomies should be constructed in the right-lower quadrant of the abdomen, inside a triangle with borders formed by the pubic tubercle, the anterior superior iliac spine, and the umbilicus (Fig 1). The stoma should be brought through the rectus abdominis muscle, as this helps to support the stoma and may help prevent stomal prolapse and parastomal hernia.<sup>3</sup> Ileostomies should always be created in a location separate from the main incision, as this decreases the incidence of incisional hernia as well as wound infection.<sup>5</sup>

A midline incision is usually best, followed by resection of the appropriate section of bowel. As much of the ileum should be preserved as possible to prevent vitamin B<sub>12</sub> malabsorption and in case further resection is warranted in the future. The terminal ileum is divided with a linear cutting stapler, and attention is turned to preparing the ileum for stoma formation. Any retroperitoneal attachments are divided to allow a tension free stoma. The mesentery to the ileum is then divided whereas maintaining adequate blood supply to the terminal section of ileum. This is accomplished by identifying the large avascular window between the ileocolic vessels and the terminal branches of the superior mesenteric artery that parallel the ileum. This leaves a strip of mesentery with the terminal ileum that contains blood supply to the future stoma, thereby reducing the incidence of stomal ischemia (Fig 2).

Attention is then turned toward the previously marked stoma site. The skin at the site is grasped with a Kocher clamp, and a circular incision is made around the clamp, permitting a disc of skin 2.5 cm in diameter to be excised (Fig 3). Subcutaneous fat should not be excised, as this will help to support the stoma, and its presence helps prevent formation of a dead space. The fat is separated through Scarpa's fascia using electrocautery until the anterior rectus sheath is exposed. Small retractors are used to provide exposure. The

anterior rectus sheath is vertically incised for 3 to 4 cm. Small horizontal cross hatches (1 cm in length) are then created at the midpoint of the vertical incision, thereby creating a cruciate incision in the fascia. Placement of the nondominant hand inside the abdomen helps protect the viscera and assists with exposure (Fig 4). The fibers of the rectus abdominis are bluntly separated in the direction of the fibers using a Kelly clamp, and the retractors are repositioned, exposing the posterior rectus sheath. Ensuring protection of the viscera with the nondominant hand, the posterior rectus sheath is then incised. The resulting fascial defect should be enlarged to allow passage of two fingers (Fig 5). It is important that the defect in the rectus sheath not be too small, thereby compromising blood supply to the stoma. The stoma site is then examined and any small bleeding vessels are cauterized.

A Babcock clamp is then passed through skin defect into the peritoneal cavity, and the stapled end of ileum is grasped. The ileum is carefully delivered through the defect in the abdominal wall, until 5 to 6 cm of ileum is present above the skin. This length is necessary to create a proper everting ileostomy spout. The mesentery to the ileum should be oriented cephalad as it passes through the defect. Next, the ileum is carefully observed for any ischemia; it should appear pink, well perfused, and under no tension. The midline incision is then closed in the usual fashion, and covered with a towel to prevent contamination when the bowel is opened.

The stapled end of the ileum is excised using heavy scissors to produce a bleeding end, which provides evidence of adequate blood supply. An absorbable 3-0 or 4-0 suture is first placed full thickness through the bowel at the cut edge, then is placed through only the seromuscular layer of the bowel at the skin level (3-4 cm below the cut edge), then through the adjacent dermis. This suture is clamped, not tied at this point (Fig 6). Three other sutures are placed in the same manner 90 degrees apart and clamped. Next, four additional sutures are

placed between the four everting sutures to complete the mucocutaneous anastomosis. These should be placed with the same 3-0 or 4-0 absorbable suture and should contain both a full thickness bite of the cut edge of ileum and the dermis. No seromuscular layer is included. All sutures are then tied, creating an everted stoma. The final ileostomy should protrude 2 to 3 cm from the skin. A clear ostomy appliance is then applied that allows easy visualization of the new stoma.

## Complications

Complications are frequent after ileostomy. Many adverse events after ileostomy (eg, peristomal skin irritation) can be effectively managed by enterostomal care and are transient. Although an extensive discussion about postoperative complications after ileostomy is beyond the scope of this article, it is worth mentioning several of them. Common early complications after ileostomy are skin irritation, ischemia of the stoma, dehydration (from high-ostomy output), and leakage. Later complications include stomal stenosis (usually from ischemia), parastomal hernia, stoma prolapse, and bowel obstruction. It is clear that many of these complications can be prevented by careful preoperative selection of the stoma site, and early involvement of an enterostomal therapist.

## Conclusion

Creating an end ileostomy still has an important role in many patients. Several important points deserve emphasis. Taking the time to select the most appropriate site for the ileostomy preoperatively will significantly improve postoperative quality of life for the patient. Meticulous technique in preparing the stoma without tension and ensuring adequate blood supply will reduce postoperative complications. Enterostomal therapists have a critical role in patient education, assistance, and management of many stoma related problems, and should be involved routinely in the care of patients with ileostomies whenever possible.

## References

1. Cataldo PA: History of stomas, in Cataldo PA, MacKeigan JM (eds.): *Intestinal Stomas: Principles, Techniques, and Management*. New York, NY, Marcel Dekker, 2004, pp 1-38
2. Jimmo B, Hyman NH: Is ileal pouch-anal anastomosis really the procedure of choice for patients with ulcerative colitis? *Dis Colon Rectum* 41:41-45, 1998
3. Hyman N: End ileostomy, in Cataldo PA, MacKeigan JM (eds.): *Intestinal Stomas: Principles, Techniques, and Management*. New York, NY, Marcel Dekker, 2004, 151-164
4. Bass EM, Pino AD, Tan A, et al: Does preoperative stoma marking and education by the enterostomal therapist affect outcome? *Dis Colon Rectum* 40:440-442, 1997
5. Williams JG: *Intestinal stomas*, in Souba, WW (ed): *ACS Surgery: Principles & Practice*. New York, NY, WedMD, 2006, p 803