Ulcerative Colitis

4

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4.1 Introduction

Surgical options for ulcerative colitis (UC) have evolved tremendously in the past 50 years, since the time when patients with incapacitating disease were largely treated with total proctocolectomy and permanent conventional ileostomy (TPC). In present times, UC patients enjoy a number of surgical options including the possibility of intestinal reconstruction after proctocolectomy with an ileal pouch-anal anastomosis (IPAA). After proctocolectomy, patients are able to regain good quality of health and life either by accepting a permanent ileostomy or by pursuing restoration of intestinal continuity with an IPAA. Proper surgical technique is mandatory for best outcomes and to reduce the risk of complications that may compromise quality of life. This section will focus on appropriate surgical technique in patients undergoing surgery for UC. In addition, both common and uncommon techniques of restoration of intestinal continuity via IPAA will be described.

4.2 Surgical Options for UC

TPC was initially considered the most effective surgical 'cure' for ulcerative colitis [1, 2] and is still an option for patients who prefer a definitive operation and are accepting of a permanent stoma [3, 4]. TPC is also recommended in patients who are not good candidates for IPAA, such as those with impaired anal sphincter function or reduced mobility or comorbid diseases [5, 6].

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Total abdominal colectomy with ileorectal anastomosis (IRA) has been performed in selected patients who wish to avoid a stoma, but at the risk of post-operative complications and recurrent disease or cancer in the retained rectum.

Restorative proctocolectomy with IPAA is the current preferred surgical option for patients who wish to avoid a permanent conventional ileostomy but also desire an acceptable quality of life and bowel function [7]. IPAA has undergone several modifications in its approach since it was popularised in the early 1980s. Over this time, the technical aspects of IPAA surgery have been modernised, functional outcomes have improved and pouch survival has remained high in patients who are treated in high-volume IPAA centres [8].

4.3 Total Proctocolectomy with Conventional End Ileostomy (TPC)

TPC is a curative operation that allows for complete removal of the colorectal mucosa that utilises an intersphincteric technique for proctectomy rather than low stapling with preservation of the anal transition zone. TPC can often be performed in a single surgical setting (one operation) with less technical challenge than that required for IPAA. Although some have shown a similar morbidity between TPC and IPAA, TPC is associated with less-severe complications, a characteristic ideal for elderly UC patients desiring a surgical cessation of symptoms and to prevent dysplasia or cancer development (Fig. 4.1) [6].

One of the most significant drawbacks of TPC is the requirement for a permanent ileostomy, which carries with it the associated risks for pouching difficulties, parastomal hernia and stomal prolapse. Permanent ileostomy may impact body image and quality of life negatively, a parameter that is meant to improve after surgery in these patients [9]. Patients may experience difficulty in healing the perineal wound even

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when an intersphincteric approach is undertaken and delayed wound healing may occur in 18–25% of this population [10–12]. Patients undergoing TPC must still undergo pelvic dissection and be accepting of the inherent risk of pelvic nerve damage, which may lead to irreversible sexual and urinary dysfunction similar to that with IPAA.

4.4 Creation of Conventional End Ileostomy

When creating an ileostomy, whether intended to be temporary or permanent, one should take care to create the best ileostomy possible because many ileostomies that have been kept life-long were initially anticipated to be temporary. The patient should consult with an enterostomal therapist preoperatively for counselling and to identify an ideal location on the abdominal wall. The ileum should be well-perfused and healthy. A skin defect is created at the appropriate site and the subcutaneous tissues and anterior rectus sheath are divided in a linear fashion, parallel to the midline of the abdominal wall. The muscle layer is gently split with a clamp and the posterior rectus sheath is divided similarly. Placement of a folded surgical sponge underneath the marked area with gentle upward force assists in creation of the aperture while protecting intra-abdominal contents. The cut end of the ileum is brought up through the aperture, taking care to avoid shear damage to the mesentery and the bowel is everted and secured into place with absorbable sutures joining the full thickness bowel wall to the dermis of the skin aperture.

4.5 Restorative Proctocolectomy with Ileal Pouch-Anal Anastomosis (IPAA)

IPAA has been the preferred surgical option for patients with ulcerative colitis for nearly four decades [13, 14]. In most cases, patients experience excellent quality of life with a resilient surgical and functional result and avoid a permanent

Figure 4.1

Placement of anal effacement sutures (#1 polyglactin) in the perineum in preparation for intersphincteric proctectomy in a patient undergoing total proctocolectomy with end ileostomy. Effacing the anal canal in this manner allows for easier identification of the intersphincteric groove and optimal exposure of the distal anal canal

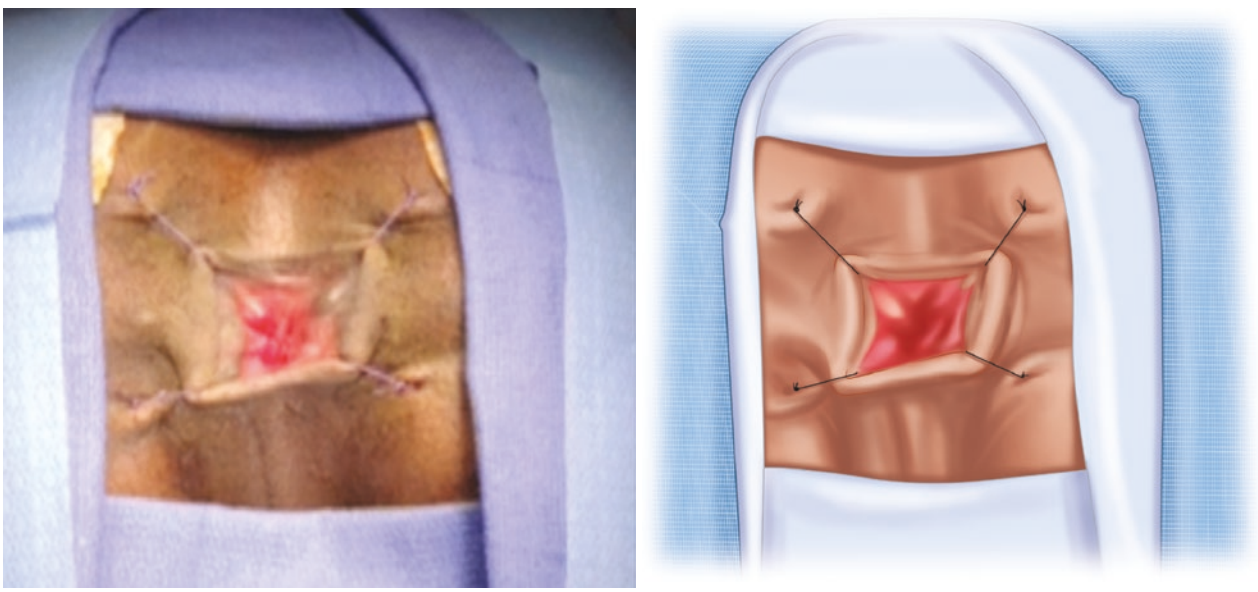
conventional ileostomy. IPAA has undergone several modifications in its approach since it was popularised in the early 1980s. Over this time, the technical aspects of IPAA surgery have been modernised, functional outcomes have improved and pouch survival has remained high in patients who are treated in high-volume IPAA centres.

IPAA surgery is performed in conjunction with resection of the colorectum, with subsequent creation of an ileal reservoir constructed from varying lengths of distal ileum. To restore intestinal continuity, this reservoir is then joined to the anal transition zone in a stapled or hand-sewn fashion. In rare circumstances, patients may undergo restorative proctocolectomy with IPAA in one operation, as long as they are otherwise fit and have no risk factors for poor healing [15, 16]. However, the large majority of patients undergoing IPAA surgery suffer from fulminant colitis, are in poor health or are affected by immunosuppressive agents and are best served with the procedure performed in multiple operations [8]. This staged approach begins with colectomy and end ileostomy, followed by proctectomy with diverted IPAA when health is restored, usually after a waiting period of 6 months or more.

Ideally the patient is positioned in a modified lithotomy Lloyd-Davies position with arms tucked to the side to allow for unconstrained surgeon movement on either side of the operating table. Positioning the arms out to the side severely limits surgeon comfort and positioning for deep pelvic dissection and should be avoided. The abdominal location previously marked by ET for an ideal stoma site is noted and identified. A large-bore mushroom drain is placed transanally to allow for rectal irrigation with saline until clear, followed by irrigation with iodine solution. The mushroom drain is kept in place for ongoing drainage during rectal mobilisation. Ureteric stents are not routinely used for de novo IPAA, although placement is at the discretion of the surgeon.

Regardless of the surgical approach (open versus laparoscopic), meticulous surgical technique must be strictly performed for optimal outcomes, although variations in technique exist among high-volume centres. Colectomy is

Figure 4.1



best performed with minimal handling of the bowel, with either a medial-to-lateral (authors' preference) or lateral-to-medial approach (Fig. 4.2).

In the setting of cancer, dysplasia or risk for occult malignancy high ligation of vascular pedicles should be performed. In a three-staged IPAA approach, colectomy and end ileostomy are performed with transection of the most distal aspect of the ileum and the distal sigmoid colon. Complete preservation of every centimetre of small bowel is essential and ileal transection is best accomplished after detachment of the fold of Treves as close to the ileocaecal junction as possible. When tissues are friable, as seen in IBD or if the distal colonic staple line is questioned, the distal sigmoid colon should be implanted in the lower abdomen subcutaneously, such that staple line dehiscence will manifest as wound drainage rather than abdominopelvic abscess.

Figure 4.2

A high ligation of vascular pedicles with proper oncological resection is performed in the setting of established or suspected cancer or dysplasia

Figure 4.3

A total mesorectal excision (TME) is performed, beginning posterior to the cut edge of the inferior mesenteric artery and continuing in a plane between the fascia propria of the rectum and the presacral fascia. Care is taken to identify and spare critical structures at the sacral promontory

In a two-staged approach, or in the second of a three-staged approach, proctectomy with creation of the ileal pouch is then completed (Fig. 4.3).

For these important reasons the authors prefer and strongly recommend performing total mesorectal excision regardless of oncological status: First, this is a natural plane that is more easily identified than an intramesorectal approach, even in the setting of severe, burned-out proctitis. The experienced surgeon is able to identify and preserve retroperitoneal and pelvic structures such as ureters and pelvic nerves (Fig. 4.4).

Second, intramesorectal dissection results in remnant tissue at the sacral promontory and into the distal pelvis, which may contribute to pouch dysfunction in the following ways. Extra tissue at the sacral promontory requires the small bowel mesentery to be more lengthy to obtain adequate reach

Figure 4.2

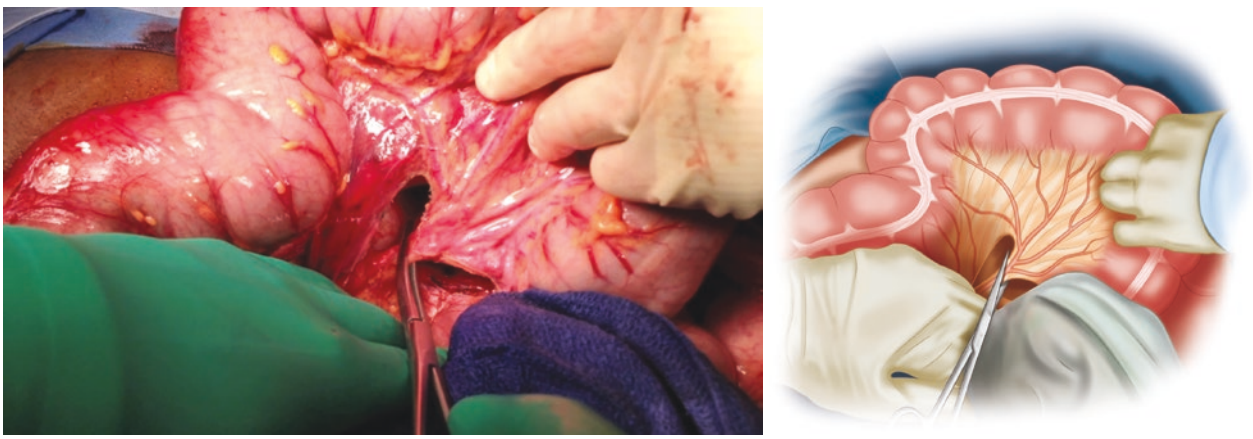
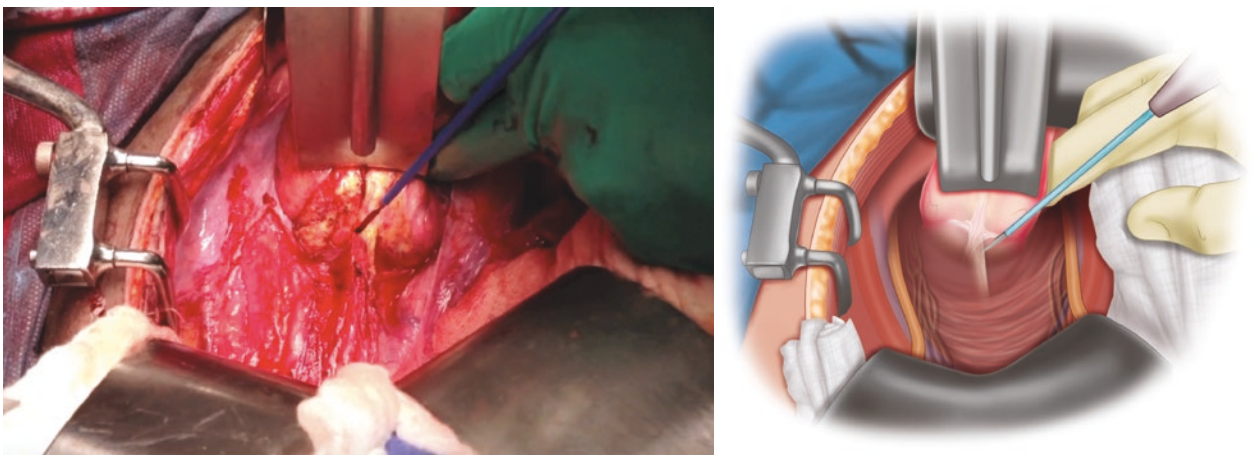


Figure 4.3



into the distal pelvis. The trajectory into the deep pelvis is lengthened in this scenario and the pouch mesentery must travel 'up and over' the remnant tissue to reach the distal pelvis, causing tension in some cases. This remnant mesorectum in the distal pelvis can act as an obstructive 'collar' causing outlet obstruction and can contribute to ischaemia at the pouch-anal anastomosis, increasing the risk of anastomotic leak.

Dissection commences in a circumferential fashion, with anterior dissection performed in a plane posterior to the reflection of Denonvillier if no oncological issues are present. This allows for better preservation of anterior

Figure 4.4

TME is performed and complete removal of the rectum and mesorectum is shown. No extraneous tissue remains at the sacral promontory. Seen clearly here are the hypogastric nerves

Figure 4.5

To facilitate adequate reach of the ileal pouch, mesenteric lengthening procedures are sometimes necessary. Here, the visceral peritoneum of the small bowel mesentery is carefully incised in a linear fashion to gain extra length of the small bowel mesentery. One must be vigilant during this process to avoid injury to mesenteric vessels as this would compromise perfusion of the newly created ileal pouch. Adequate reach of the small bowel mesentery is required for a tension-free anastomosis to prevent anastomotic leak or chronic ischaemia at the pouch-anal anastomosis (incision line of mesentery)

nerve structures. The distal rectum is then transected with a stapling device at the level of the levator muscles, preserving the anal transition zone. This is accomplished with a 30 mm linear stapler. If a larger stapling device is required, it is likely that the dissection has not commenced to the correct level, as a 30 mm stapler should be adequate to transect the top of the anal canal with one firing. The ileal pouch is then constructed from varying lengths of distal small bowel (see discussion to follow) and joined to the top of the anal transition zone, generally with a circular stapler (Figs. 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, and 4.14).

Figure 4.4

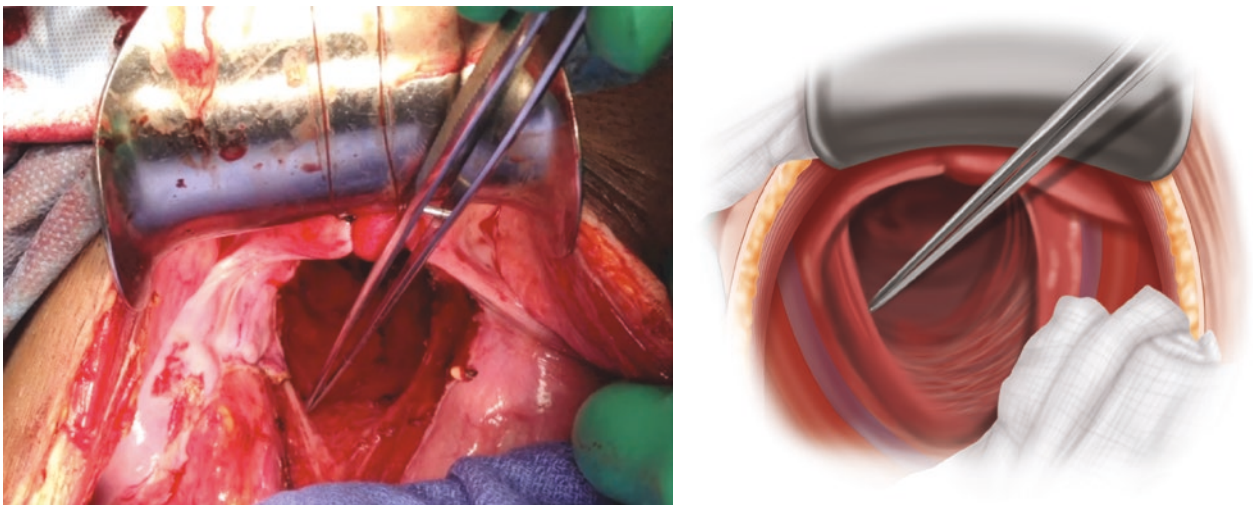


Figure 4.5

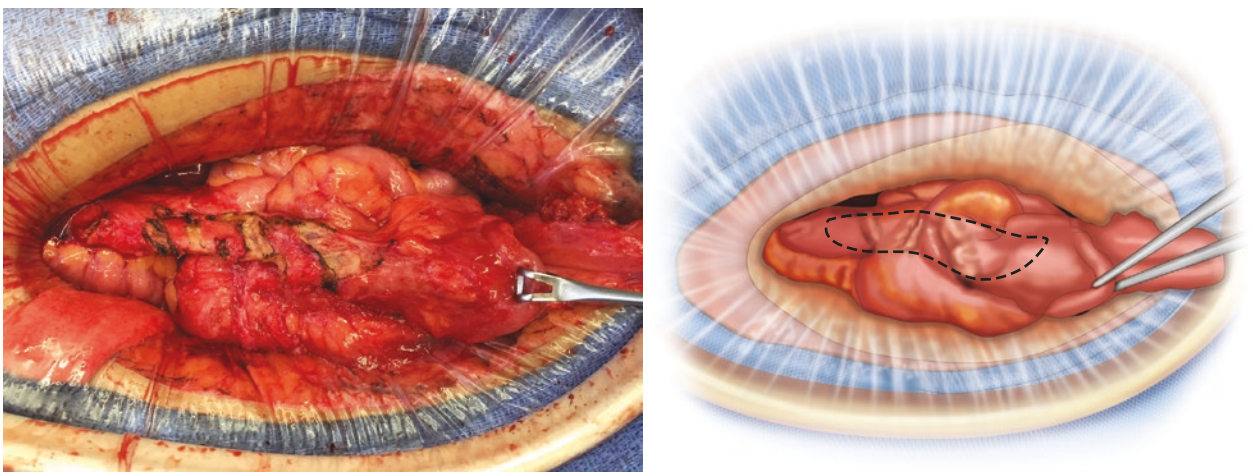


Figure 4.6

The ileum is transected just proximal to the ileocaecal valve and folded into a two-limbed J configuration in preparation for creation of an ileal J pouch. The most dependent portion of the distal ileum is identified and chosen to be the apex of a newly formed ileal J pouch. An enterotomy will be created here to facilitate pouch creation and stapling and then will be affixed to the anal transition zone to create the pouch-anal anastomosis. It is critical to choose the most dependent aspect for the apex of the pouch so that the pouch-anal anastomosis is created without any tension

Figure 4.7

An enterotomy is created in the most dependent point in the distal ileum so that the pouch can be created. This point will be part of the pouch-anal anastomosis

Figure 4.6

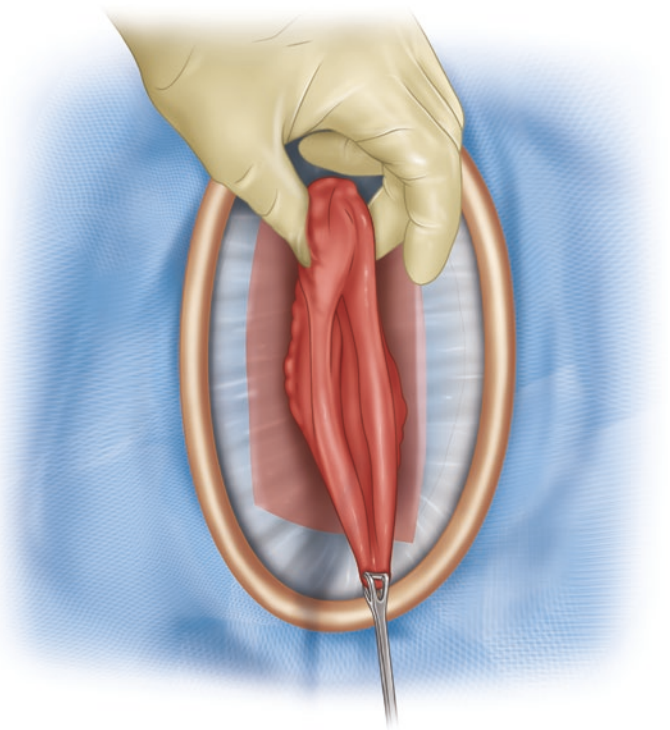


Figure 4.7

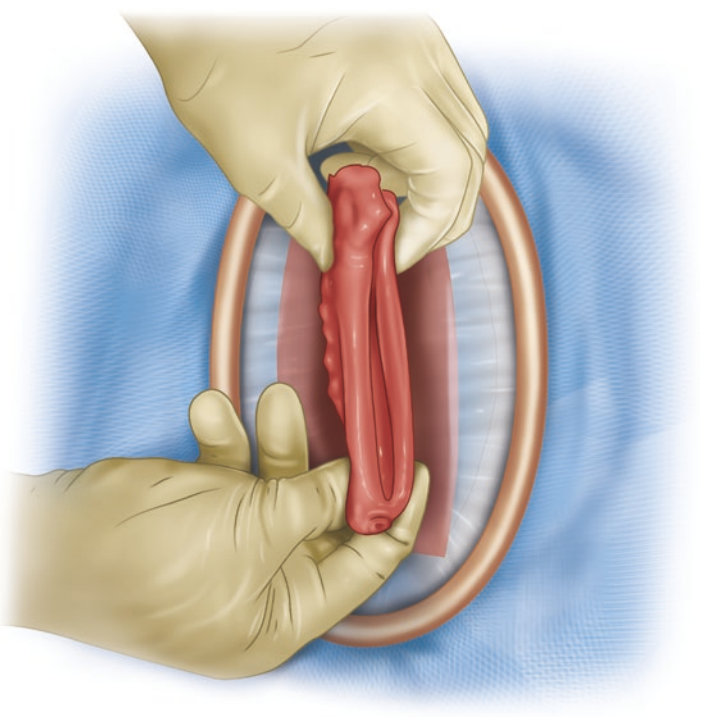


Figure 4.8

An ILA-100 stapler is used to divide the sidewall of each limb in order to create the common channel within the pouch. For a 15–20 cm ileal pouch, two firings of the stapler are generally required. The terminal end of the ileum is closed similarly with a 30 mm stapler and the staple line is underrun with a polyglactin suture

Figure 4.9

The second firing of the ILA-100 stapler is performed to complete the common channel in the newly formed ileal J pouch. Care must be taken to avoid incorporating the first staple line into the final firing

Figure 4.8

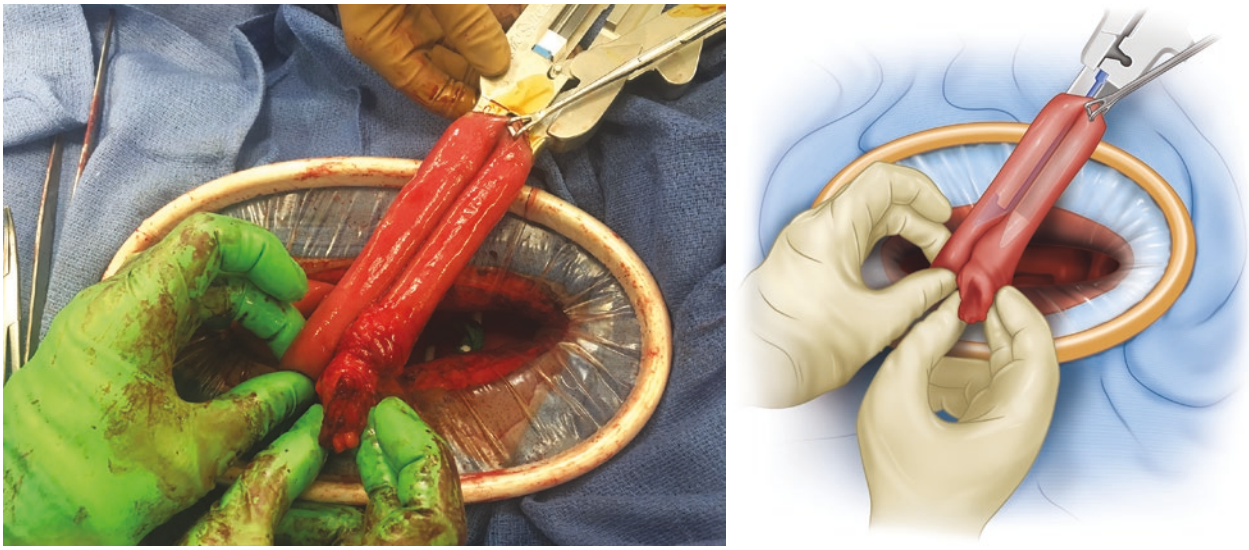


Figure 4.9

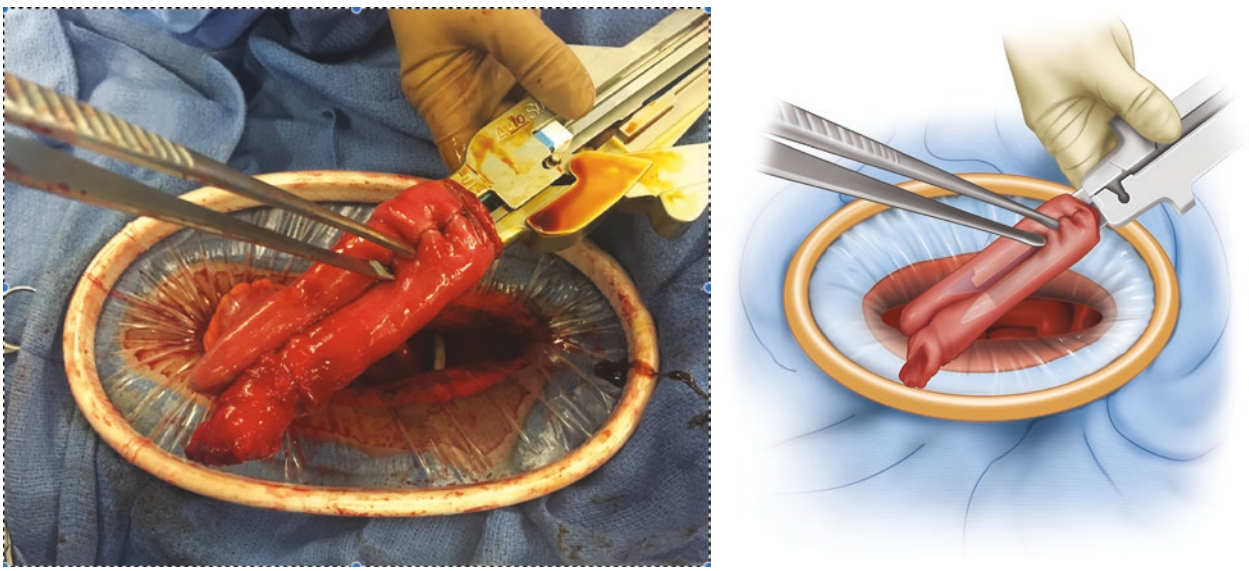


Figure 4.10

The constructed ileal J pouch is approximately 15–20 cm in length. The length should be primarily determined by the laxity of the mesentery and the most dependent point of the ileum as the apex of the pouch, rather than a pre-determined set length

Figure 4.11

The newly created J pouch is insufflated to identify leaks or defects in construction with gentle insertion of a syringe into the apex of the pouch

Figure 4.10

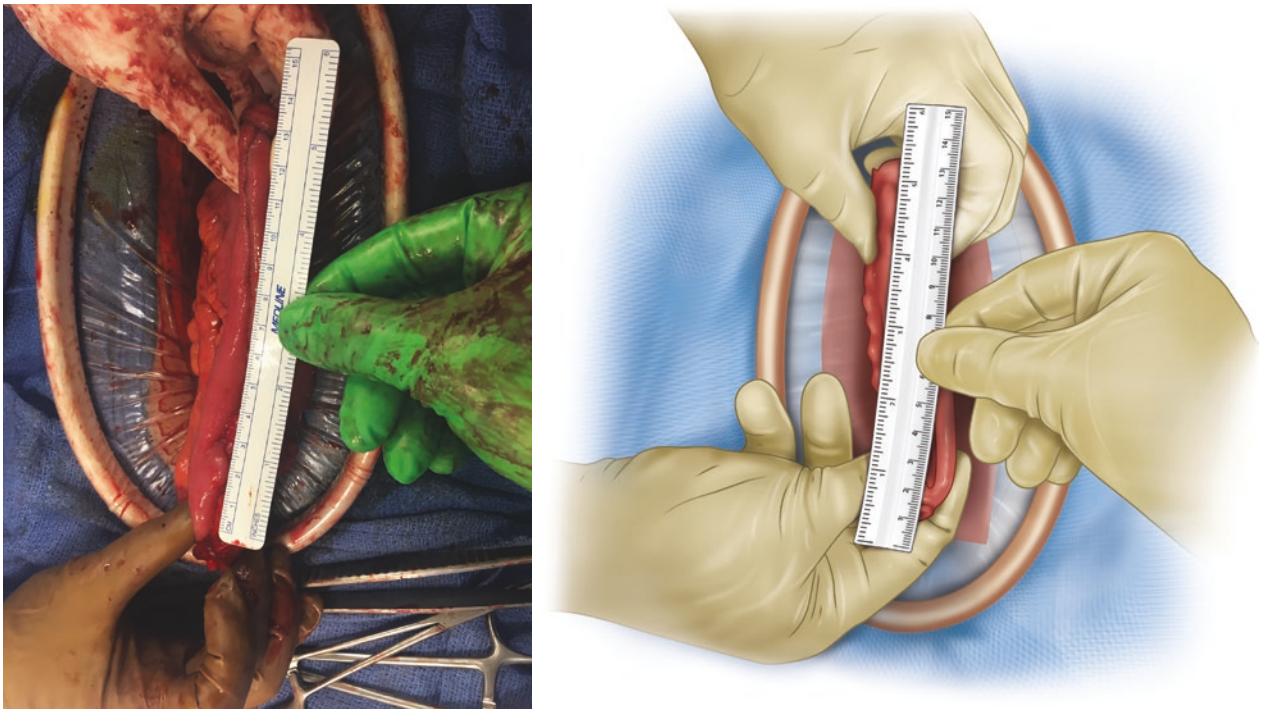


Figure 4.11

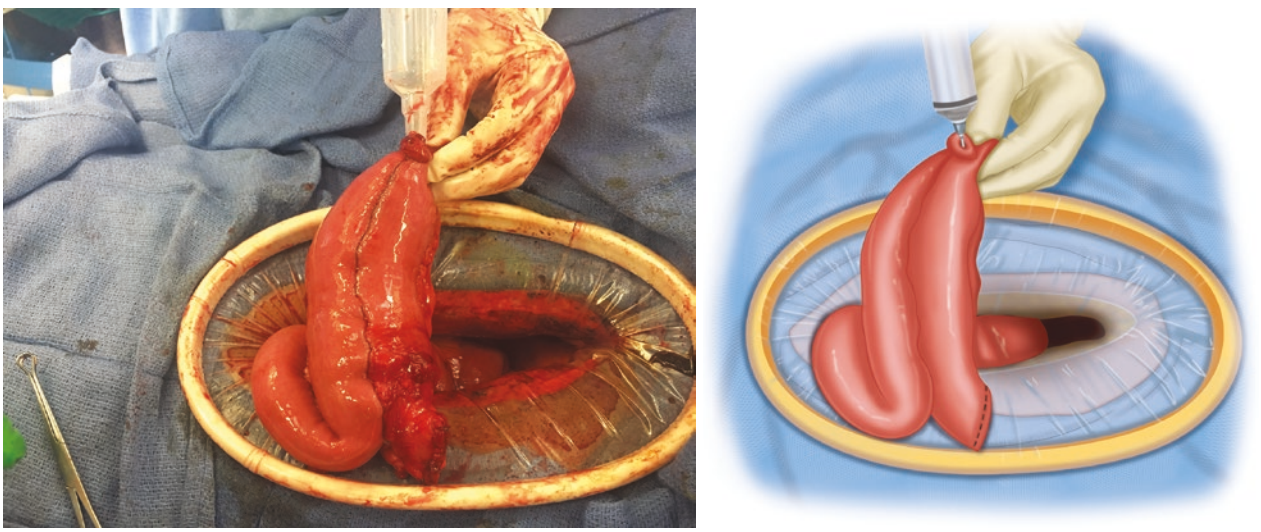


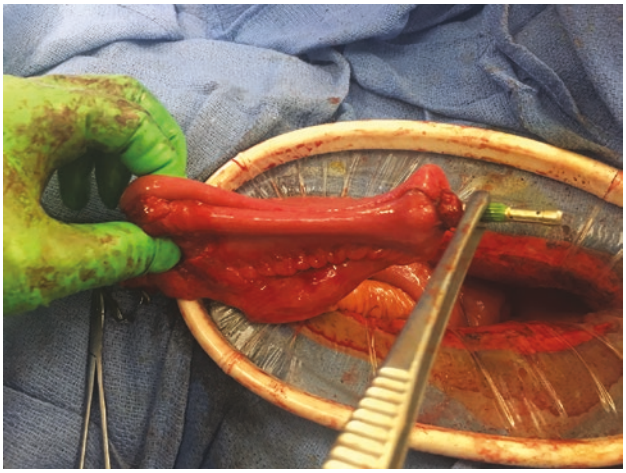
Figure 4.12

An anvil to a circular stapler is secured into place with a prolene suture in the distal portion of the ileal pouch in preparation for creation of the pouch-anal double-stapled anastomosis

Figure 4.13

A circular stapler is inserted into the anal canal and its shaft is extended just posterior to the transverse staple line at the distal rectum. The pouch-anal anastomosis is typically created with a 29- or 31-mm diameter circular stapler. One must be vigilant to ensure that the posterior wall of the vagina (in female patients) is not incorporated into the anastomosis, a devastating complication resulting in pouch-vaginal fistula

Figure 4.12



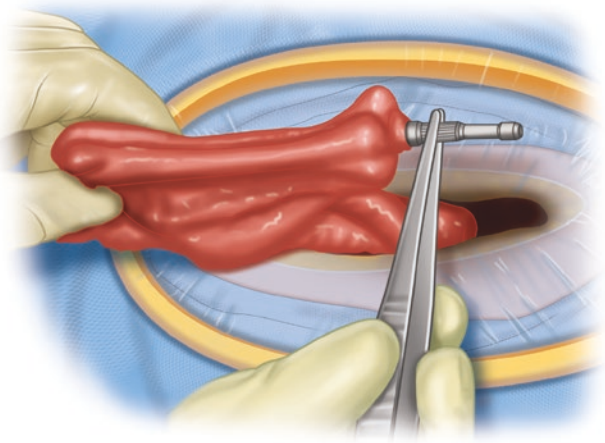
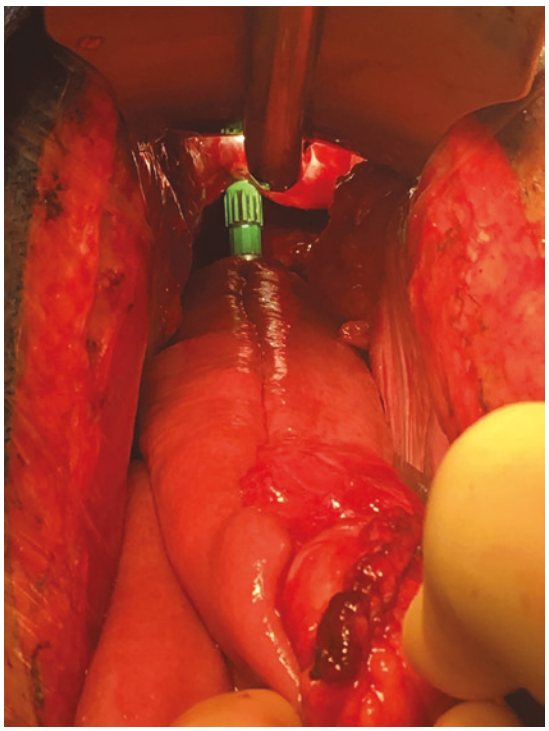


Figure 4.13



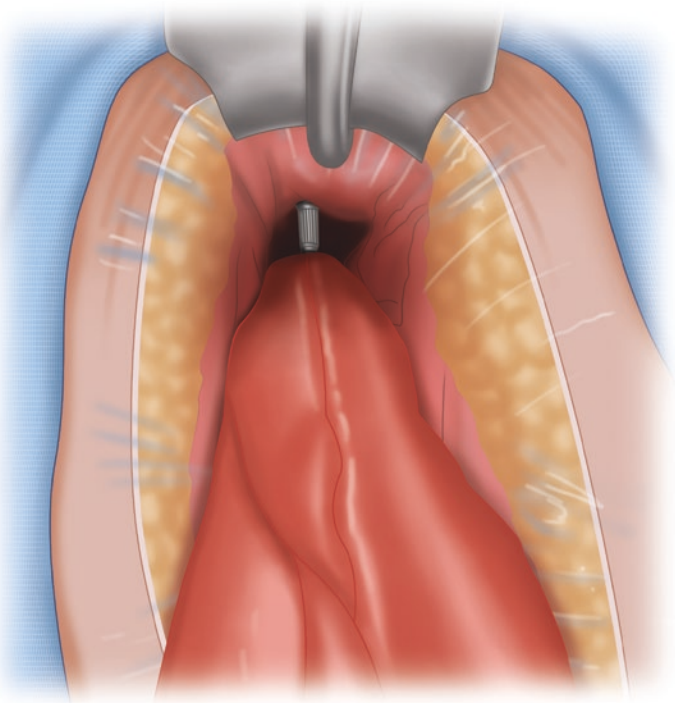
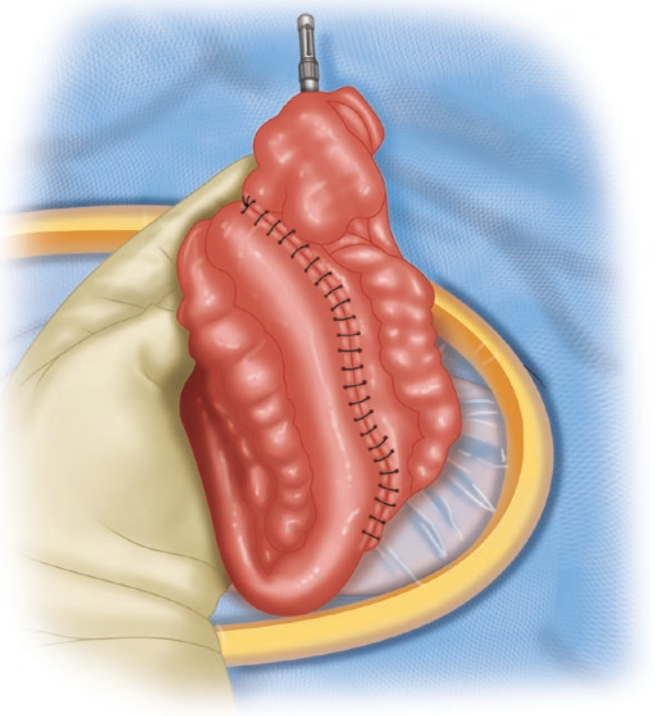


Figure 4.14

S-shaped ileal pouch, created from 3 × 15 cm limbs of small bowel. The exit conduit must be no greater than 2 cm to prevent efferent limb syndrome and obstructed defaecation

Figure 4.14



The first IPAA described an S-shaped pouch configuration, created from ileum and joined to the anal canal in a hand-sewn fashion [17]. A variety of configurations have been put into use over time, including the S, J, W, H and T arrangements [18]. Of these, the J pouch has become the most commonly used configuration to date, with its ease of construction facilitated by stapling devices [19]. The S and W pouches require a longer segment of distal ileum. They are more time-consuming, more technically challenging to create and typically necessitate a hand-sewn approach. The J pouch configuration is most commonly used unless adequate mesenteric length is not available, as creating a tension-free

Figure 4.15

In the case where a J pouch will not reach without tension, an S pouch may be helpful as its configuration allows for a longer reach into the pelvis as compared to the J pouch. Here, the limbs are approximated with a running 3-0 polyglactin seromuscular suture to create the appropriate configuration for an S-shaped pouch

Figure 4.16

The limbs are opened on the anterior surface and the posterior wall of the pouch is constructed

pouch-anal anastomosis is critical to achieve successful pouch surgery (Figs. 4.15, 4.16, 4.17, 4.18, 4.19, and 4.20).

Studies evaluating over 1500 patients undergoing three main pouch configurations (S, J, W) showed no significant difference in post-operative complications between configurations, specifically addressing risk for leak, stricture, pouchitis, sepsis and pouch failure [20]. With respect to function, the J configuration was associated with more frequent bowel motions than either S or W pouch, with J pouch patients reporting more use of anti-diarrhoeal medications. However, those with an S or W pouch were more likely to have difficult pouch evacuation requiring per anal intubation. Seepage and

Figure 4.15

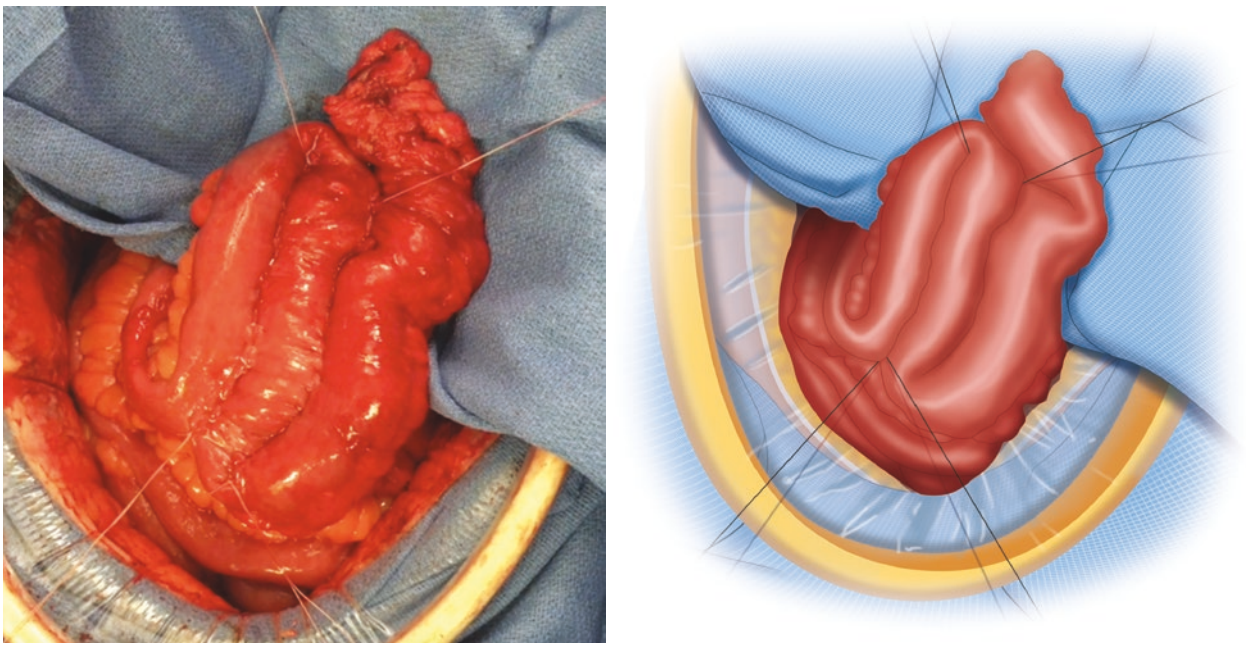


Figure 4.16

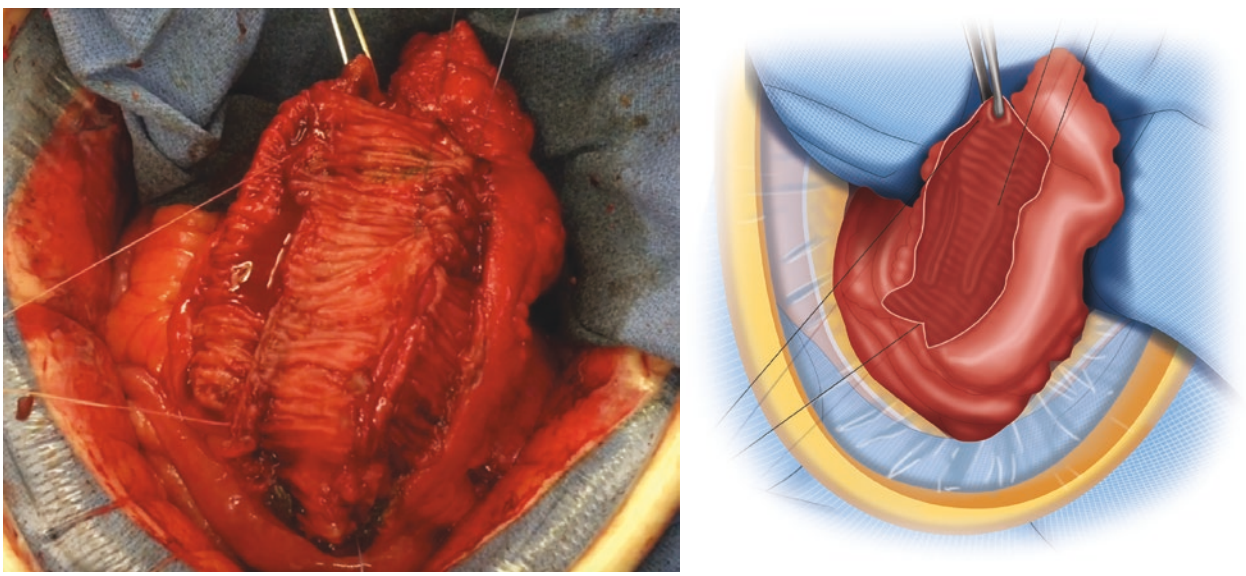


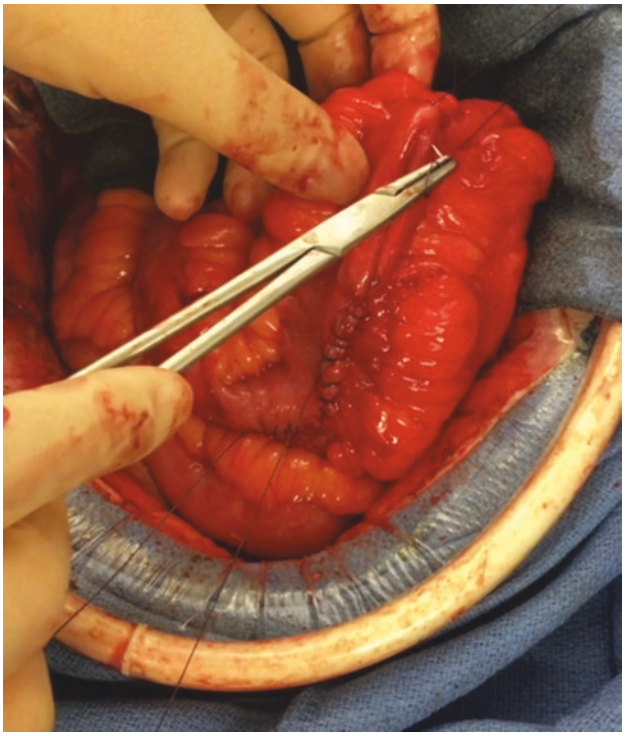
Figure 4.17

The pouch is closed with a running polyglactin suture to reapproximate the anterior pouch wall

Figure 4.18

The S pouch is completed with the exit conduit shown at top, which will be sharply trimmed to demonstrate adequate blood supply as well as to shorten the exit conduit to no greater than 2 cm. Elongated exit conduit of an S-shaped pouch is associated with efferent limb syndrome and obstructed defaecation

Figure 4.17



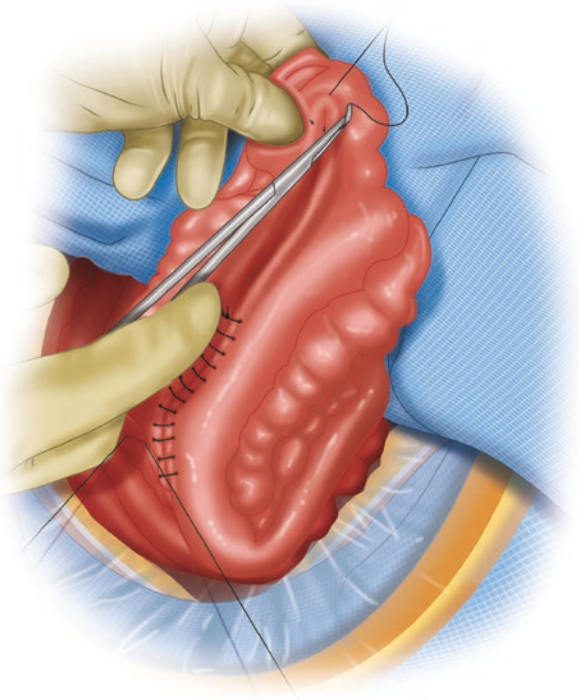


Figure 4.18

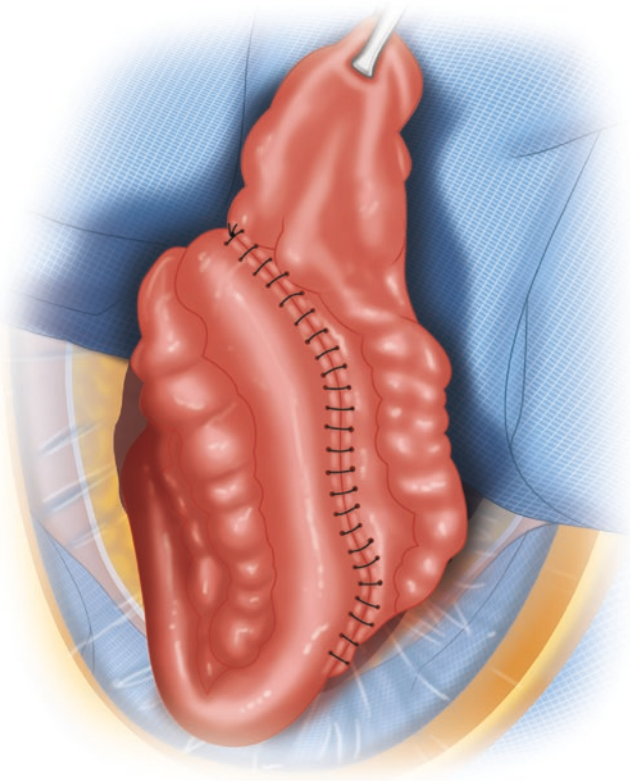


Figure 4.19

The efferent limb of the S pouch is trimmed to appropriate length to prepare for pouch-anal anastomosis. Pulsatile blood flow is also demonstrated to ensure adequate perfusion to the distal-most aspect of the pouch

Figure 4.20

An anvil to a circular stapler is secured to the distal portion of the S pouch to prepare for pouch-anal anastomosis

Figure 4.19

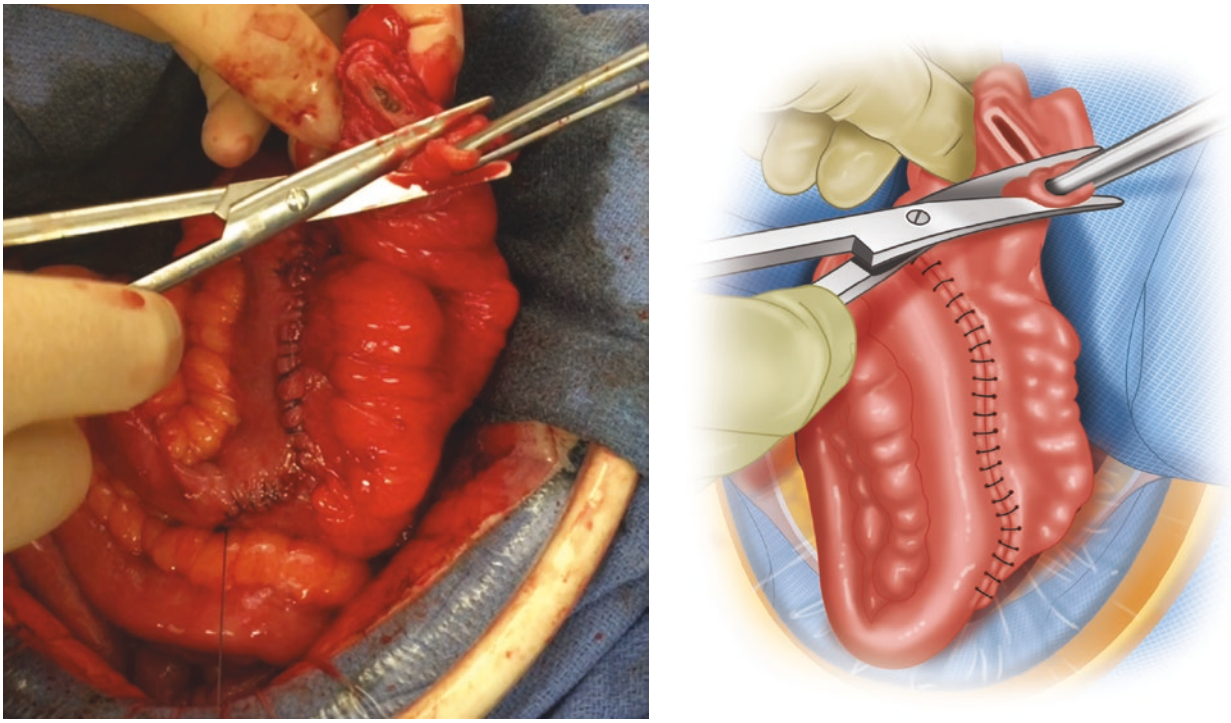
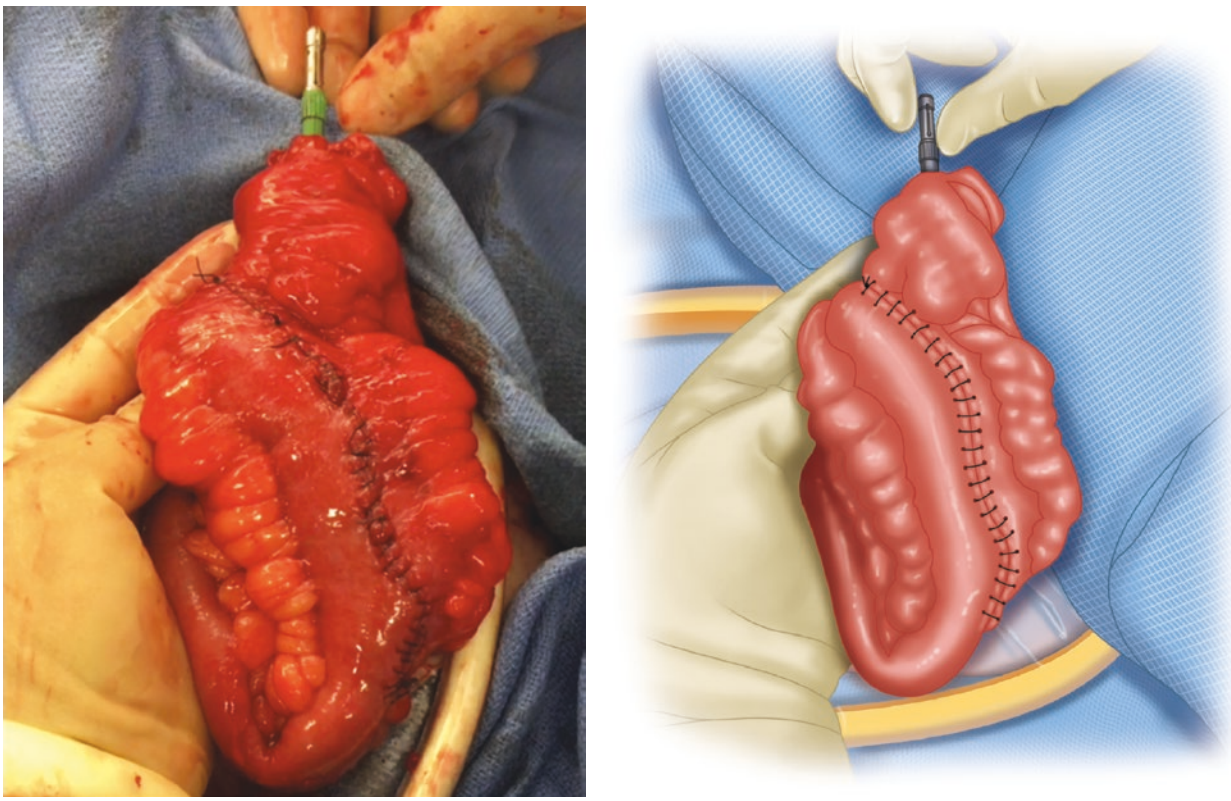


Figure 4.20



incontinence were similar among all three groups. Overall, the decision regarding pouch configuration must be individualised to the characteristics of the patient, with a J configuration typically considered the best overall choice in terms of ease of creation and acceptable functional results.

There are some instances in which the above configurations are not effective in providing intestinal reconstruction, particularly after revisionary surgery. The H pouch is a type of ileal pouch configuration that allows for pouch construction when a J or S pouch is technically feasible but mesen-

Figure 4.21

Creation of H-shaped ileal pouch. The afferent and efferent limbs are aligned adjacent to each other and an enterotomy is then made at a midpoint in both the afferent and efferent segments. A linear stapler is inserted through this enterotomy and deployed proximally and distally to create a side-to-side isoperistaltic reservoir

Figure 4.22

The mid-limb enterotomy created to allow for stapling is now closed. The distal aspect of the afferent limb, previously left open, is sewn to the anus to complete the pouch anal anastomosis after anal canal mucosectomy is performed. It is critical to ensure that the outlet of the H pouch is no more than 2 cm in length to avoid emptying issues

teric length is lacking [18]. To construct, the most dependent portion of the proposed J pouch is opened, allowing for the afferent aspect of this enterotomy to reach 2–3 cm further than a conventional J pouch. The distal-most portion of the ileum is stapled closed, as is the distal end of the enterotomy, leaving a closed segment of ileum that remains in continuity with the afferent portion as the mesentery is shared (Figs. 4.21, 4.22, 4.23, and 4.24).

Figure 4.21

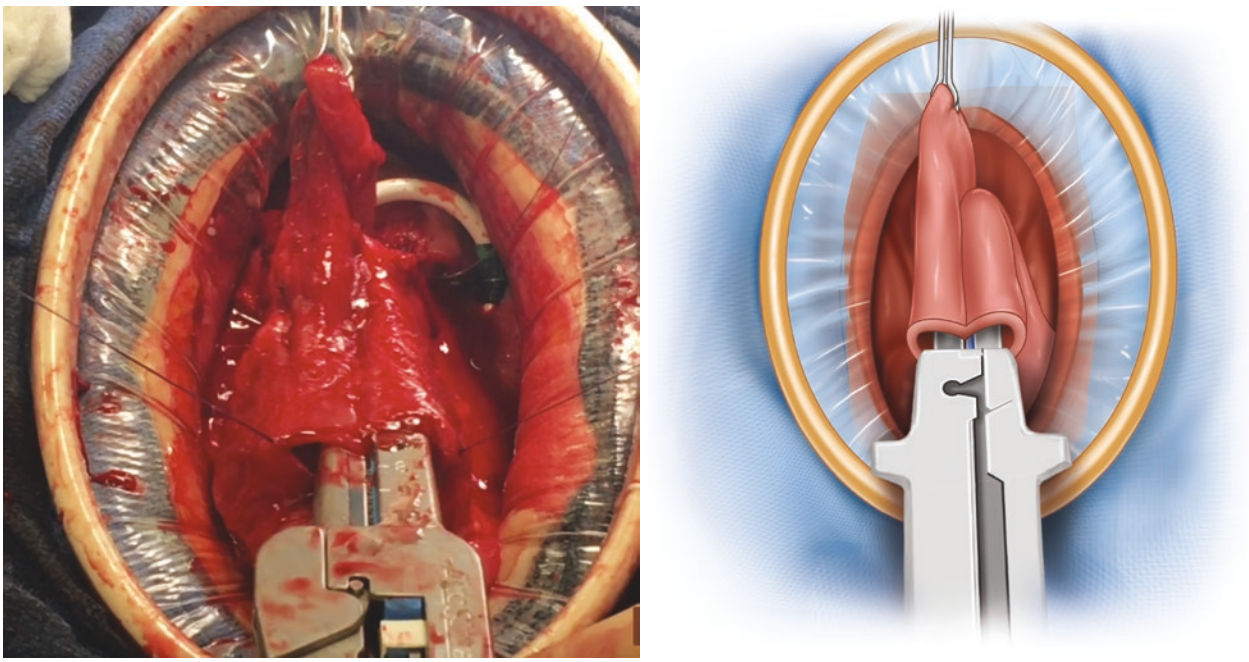


Figure 4.22

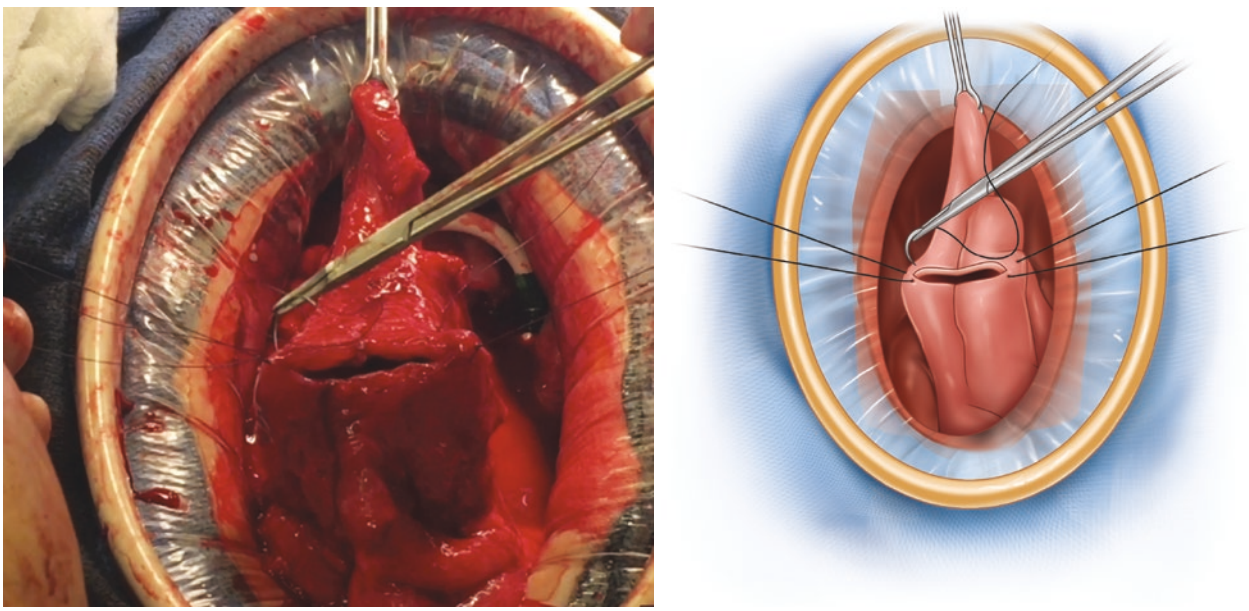


Figure 4.23

An H-shaped ileal pouch is created and insufflated to demonstrate that it is intact and water-tight

Figure 4.24

The H pouch is situated in the pelvis after pouch-anal anastomosis is complete. Data regarding use of this rare pouch configuration is very limited and reflects the uniqueness and limited use by high-volume surgeons specialising in pouch revision [18]. Its use is rarely required but offers an option when no other configurations are suitable and failure rate is in keeping with typical failure rates of other pouch revision methods. It is the practice of the authors to perform faecal diversion on all pelvic pouches except in rare circumstances

Figure 4.23

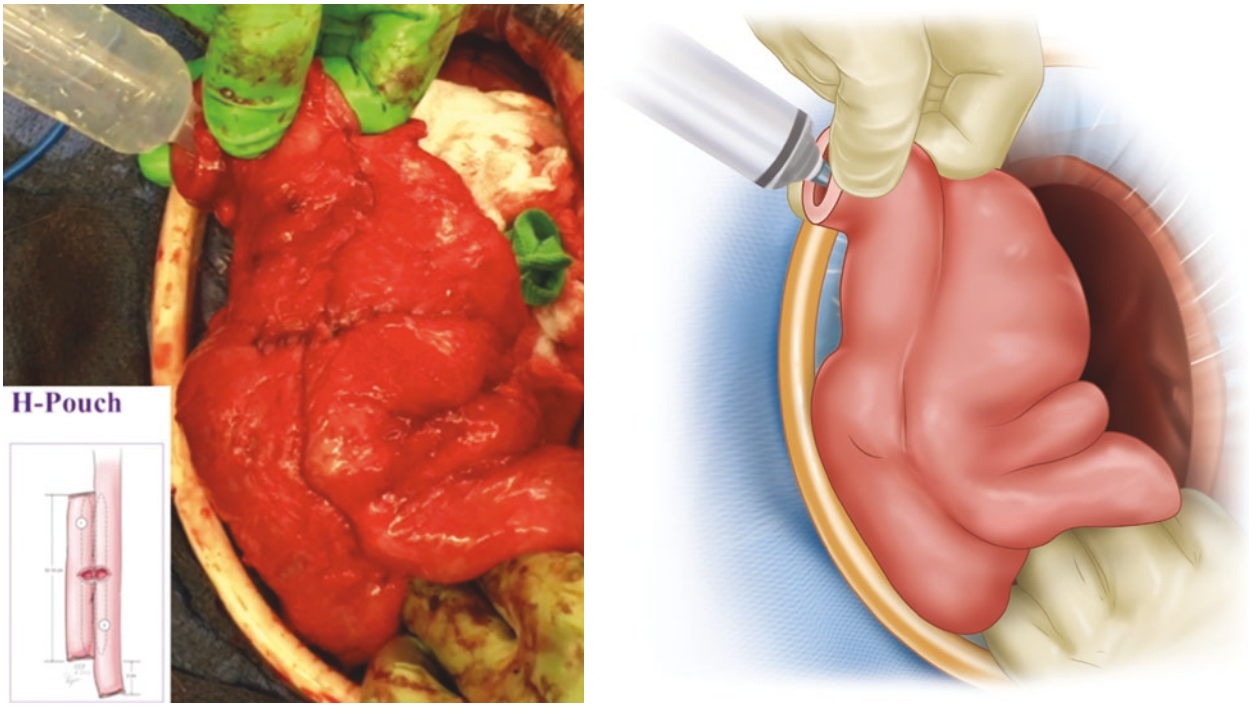
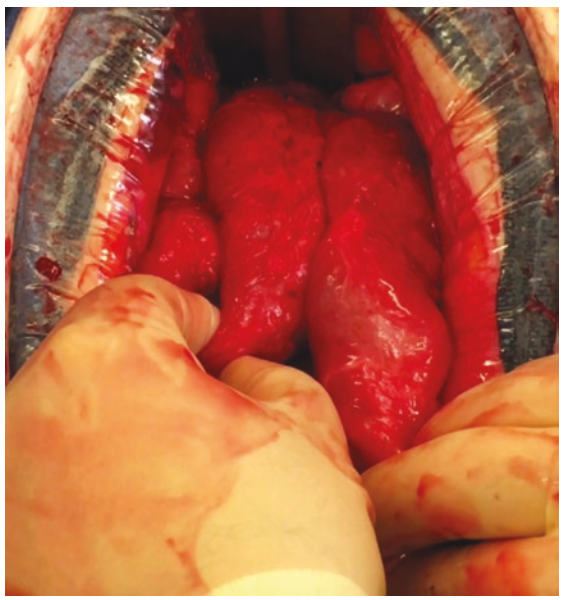


Figure 4.24



4.6 Creation of Loop Ileostomy

Proximal faecal diversion is nearly always performed to divert the faecal stream from a newly created pelvic pouch. Diversion does not prevent anastomotic or pouch leak but is thought to reduce the morbidity of pelvic sepsis and resultant fibrosis if one occurs. The exception to the rule of pouch diversion is the obese patient, in whom bringing up a loop ileostomy would put undue tension on the small bowel mesentery, thus increasing anastomotic tension.

To create a loop ileostomy, a segment of ileum upstream of the new pouch is chosen. It is brought to the site of stoma aperture ensuring that no undue tension is placed on the axis of the small bowel. The loop is then carefully manoeuvered through the abdominal wall and a stoma rod is inserted through the mesentery just below the bowel

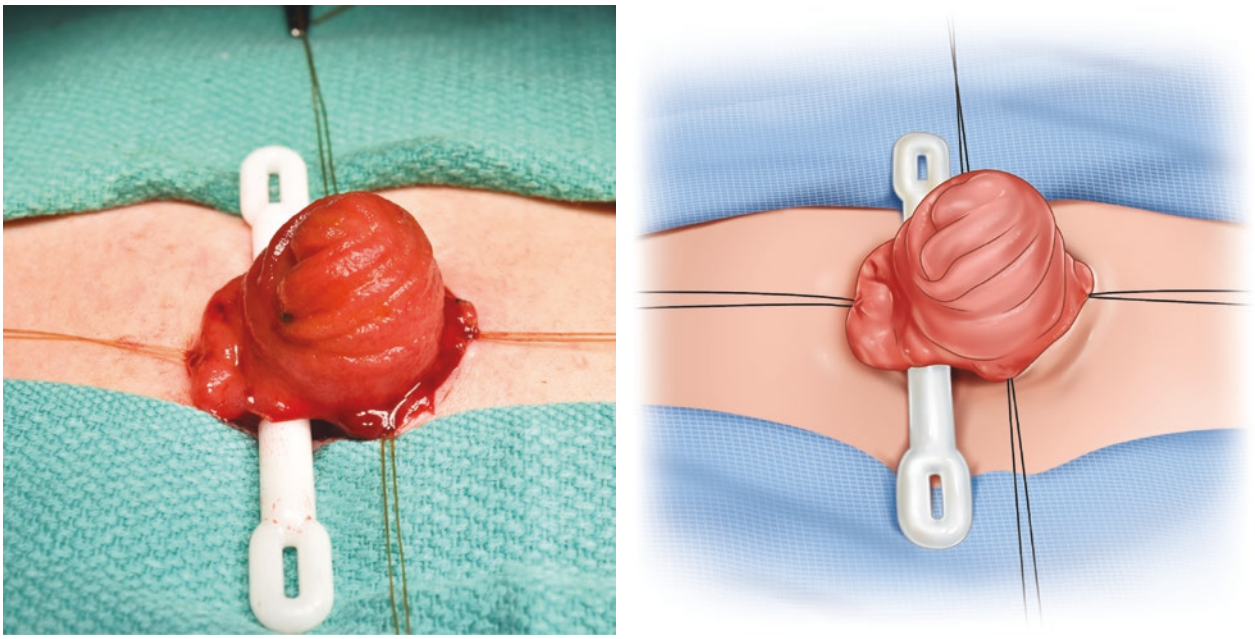
Figure 4.25

Creation of loop ileostomy with a proper eversion to allow for ideal enterostomal pouching

lumen, sparing vascular branches. A transverse incision is made on the downstream portion of the loop and the proximal 'hood' is everted using the back of a blunt forceps to create a spouting shape. Full-thickness bowel edges are affixed to the dermis of the adjacent skin using an absorbable suture.

The diverting ileostomy is closed 3–6 months later, after recovery is complete and after a distal contrast study shows appropriate distension of the new pouch and a patent anastomosis without leak or sinus tract. Not uncommonly there is a cicatrix that forms at the pouch-anal anastomosis due to disuse that is easily dilated at the time of ileostomy closure. The authors prefer a directed anal examination with the use of a tonsil clamp to dilate the soft narrowing instead of a blind digital dilatation, which can result in creation of a false passage (Fig. 4.25).

Figure 4.25



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