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*How I do it*

# The intracolonic bypass procedure

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The one-stage intracolonic bypass procedure protects an anastomosis from faecal contact without interrupting faecal flow from proximal to distal colon. The procedure consists of suturing a soft pliable latex tube, Coloshield™ (Deknatel, a division of Pfizer Hospital Products Group), to mucosa and submucosa proximal to the anastomotic site. Clinical and experimental data have indicated that the intracolonic bypass can protect the anastomosis despite maximal colonic loading, gross dehiscences or faecal peritonitis [1, 2]. In an experimental randomized prospective study in animals, comparing anastomoses protected by the Coloshield™ with or without peritonitis, vs a control primary anastomosis with or without peritonitis, there was a statistically significant increase in leak rate in the control group (data to be published). The function of the Coloshield™ is not to prevent dehiscences, which most likely are present from the time of the operation, but to prevent leakage of intraluminal content into the peritoneal cavity. The procedure should be considered as an alternative whenever a temporary colostomy or ileostomy is proposed, or whenever an anastomosis may be at risk, such as in perforated diverticulitis, obstruction, trauma, low anterior resection, ileoanal or coloanal anastomosis, with or without a reservoir.

## Technique

After the diseased colon or rectum has been resected, the proximal colon is occluded with a non-crushing

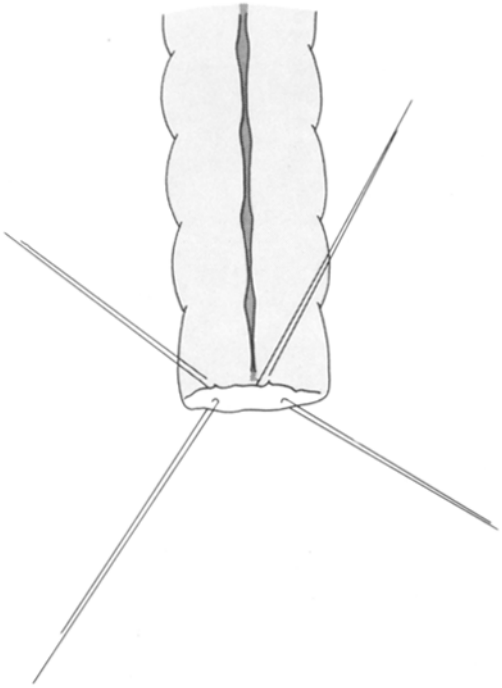


**Fig. 1.** Four equally spaced stay sutures placed about 3 cm from the end of the proximal colon

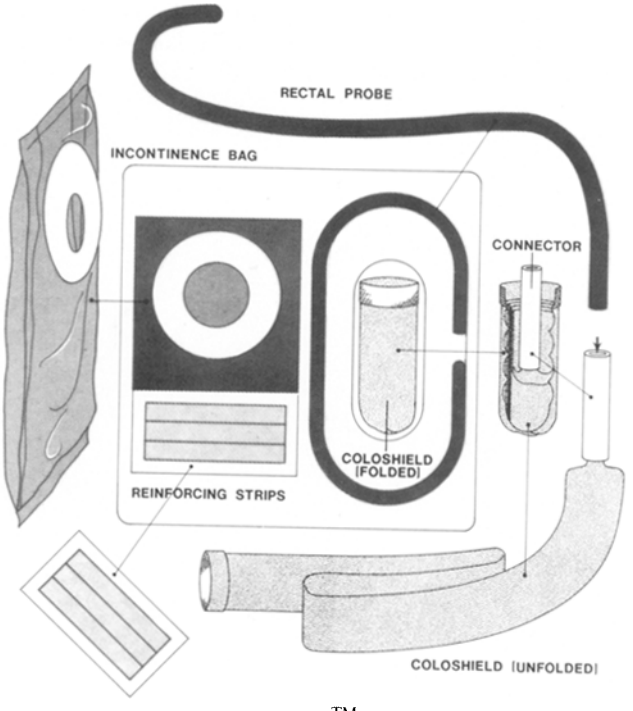



**Fig. 2.** Contents of the Coloshield™ kit

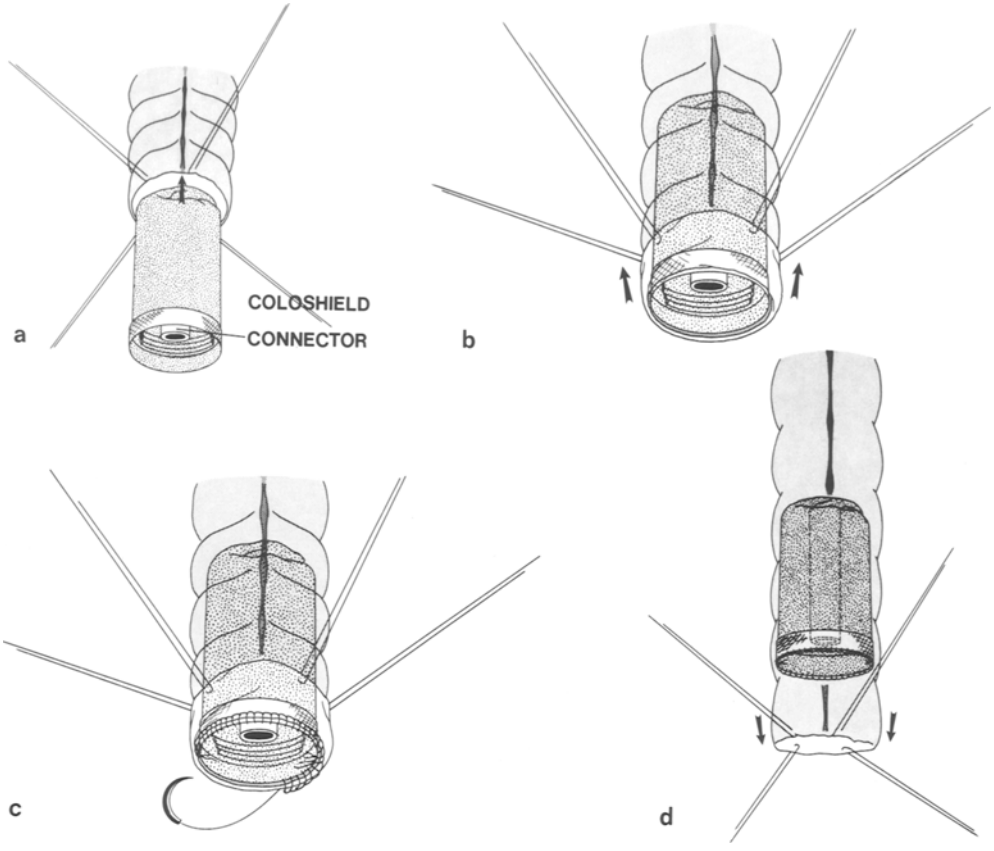



**Fig. 3.** **a, b** Insertion of the folded Coloshield™ into the proximal colon. **c** The reinforced end of the Coloshield™ is sutured with interlocking continuous sutures to the mucosa and submucosa of the proximal colon. **d** The proximal colon cuff is unfolded to its normal anatomical position

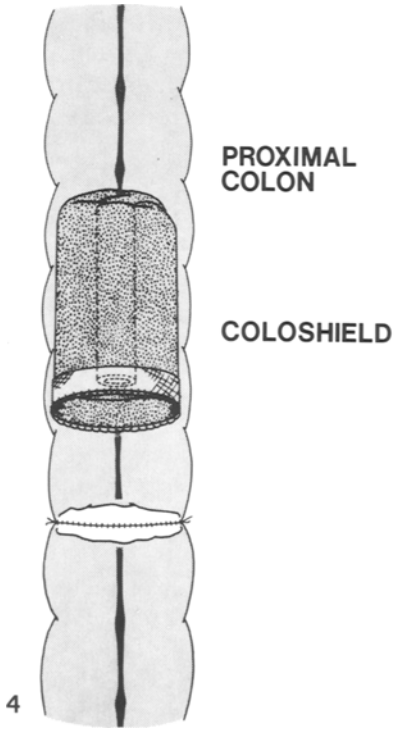



**Fig. 4.** The posterior wall colon anastomosis is completed

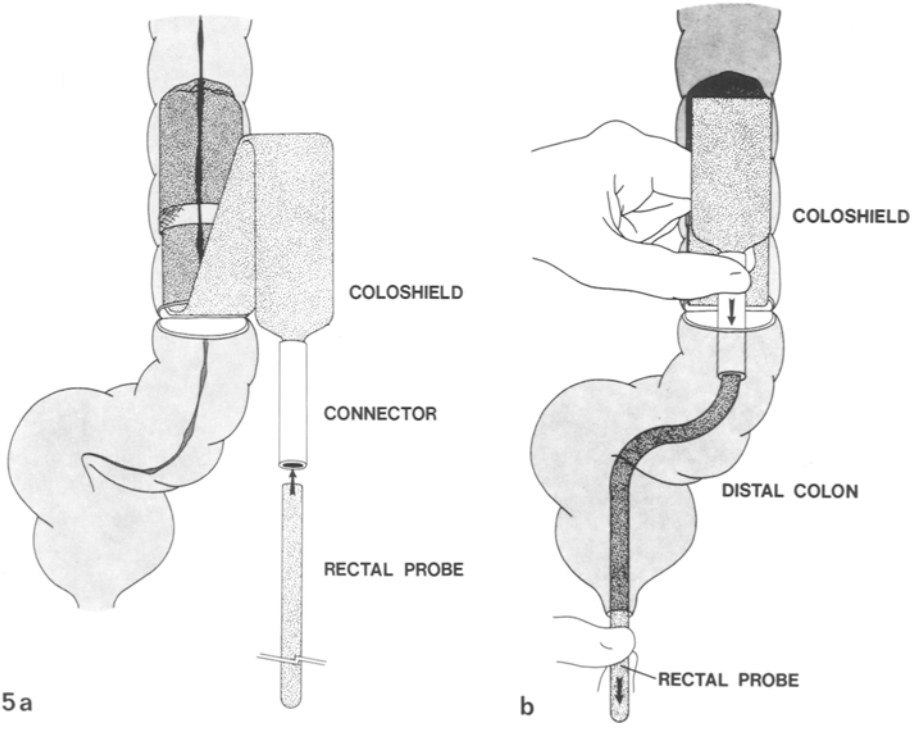
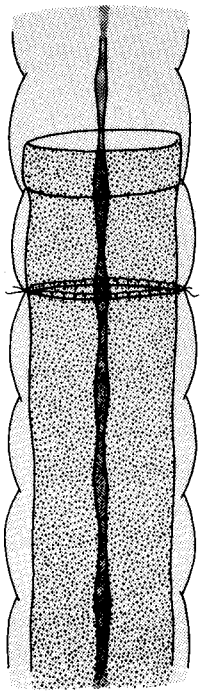



**Fig. 5.** **a** Rectal probe is pushed into the connector and the Coloshield™ has been unfolded. **b** The rectal probe has been pushed in the distal colon and out of the anus



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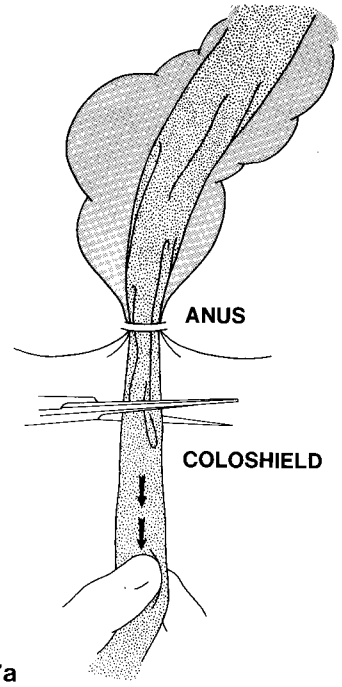


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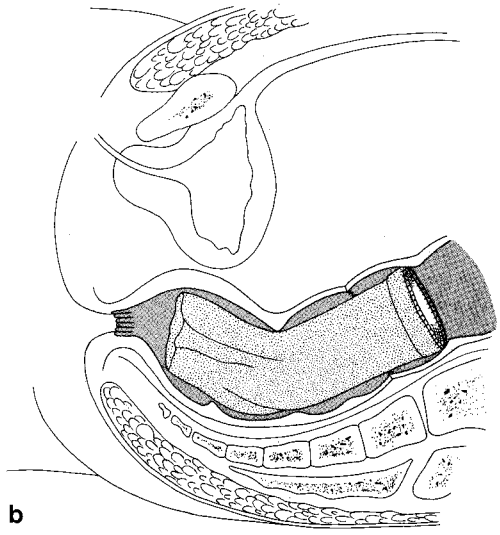

b

**Fig. 6.** The anterior colo-colic anastomosis is completed

**Fig. 7.** Slight traction is placed on the Coloshield™ and it is cut (7a) so that it lies in the rectal ampulla, (7b)

clamp about 20 cm from its end. The proximal colon is cleansed with betadine sponges before it is everted by four equally spaced stay sutures (Fig. 1). The Coloshield™ kit contains a folded Coloshield™ with a connector, a rectal probe, an incontinence bag, and reinforcing strips (Fig. 2). The folded Coloshield™ is inserted into the proximal colon up to where its reinforcing edge corresponds to the everted edge of the bowel (Figs. 3a, b). The Coloshield™ is sutured to the mucosa and submucosa of the everted proximal colon by two continuous interlocking 2–0 polyglycolic acid sutures, one for the anterior and one for the posterior halves of the bowel circumference. The suture throws should be close to one another to obtain a watertight seal (Fig. 3c). It is important to take mucosa and submucosa in order to protect the anastomosis for at least 2 weeks. The next step is to invert the proximal colon bact to its normal anatomical position (Fig. 3d). Then the posterior half of anastomosis is carried out with a single interrupted layer of 3–0 Surgilon (Fig. 4). The Coloshield™ connected is pulled out of the proximal colon and attached to the rectal probe (Fig. 5a), which is passed through the distal colon and out of the anus. An assistant will then pull it by placing a hand under the drapes (Fig. 5 b). After the Coloshield™ is pulled out completely, the anterior half of the anastomosis is completed with interrupted 3–0 Surgilon (Fig. 6). After closure of the abdomen, the tube is slightly pulled at the anus and cut (Fig. 7a) so that it retracts back into the rectal ampulla (Fig. 7b), unless resection has included the mid- or lower rectum when the Coloshield™ is left projecting from the anus. A reinforcing strip is attached to the Coloshield™ (Fig. 8a, b) and a suture is used to anchor it through the reinforcing strip to the perineum (Fig. 8c). In order to protect the patient from soiling, an anal incontinence bag is attached to the perineum after the Coloshield™ is introduced into it (Fig. 8d). If there are no complications by the seventh or eighth postoperative day, the tube is cut at the anus and the patient is discharged. An x-ray is taken after surgery in all patients to confirm the position of the device and this is repeated by the fourth postoperative week if a patient claims that the tube has not passed. All tubes pass between 2 and 3 weeks if sutured to the mucosa and submucosa, but if sutured to the mucosa alone the tube may come out in less than 1 week.

The intracolonic bypass procedure can be performed with a stapled anastomosis. The technique for suturing the Coloshield™ into the proximal colon is the same (Figs. 1–3). The purse strings are placed in the proximal and distal colon or rectum in the usual manner and the stapler introduced from the anus through the distal colon. The distal purse string is tied down onto the rod, the Coloshield™ connector is pulled out the proximal colon (Fig. 9a), and is connected to the screw of the anvil (Fig. 9b). The proximal purse is tied down to the rod after the anvil is introduced into the proximal colon (Fig. 9c). The stapler is then approximated in the usual man-

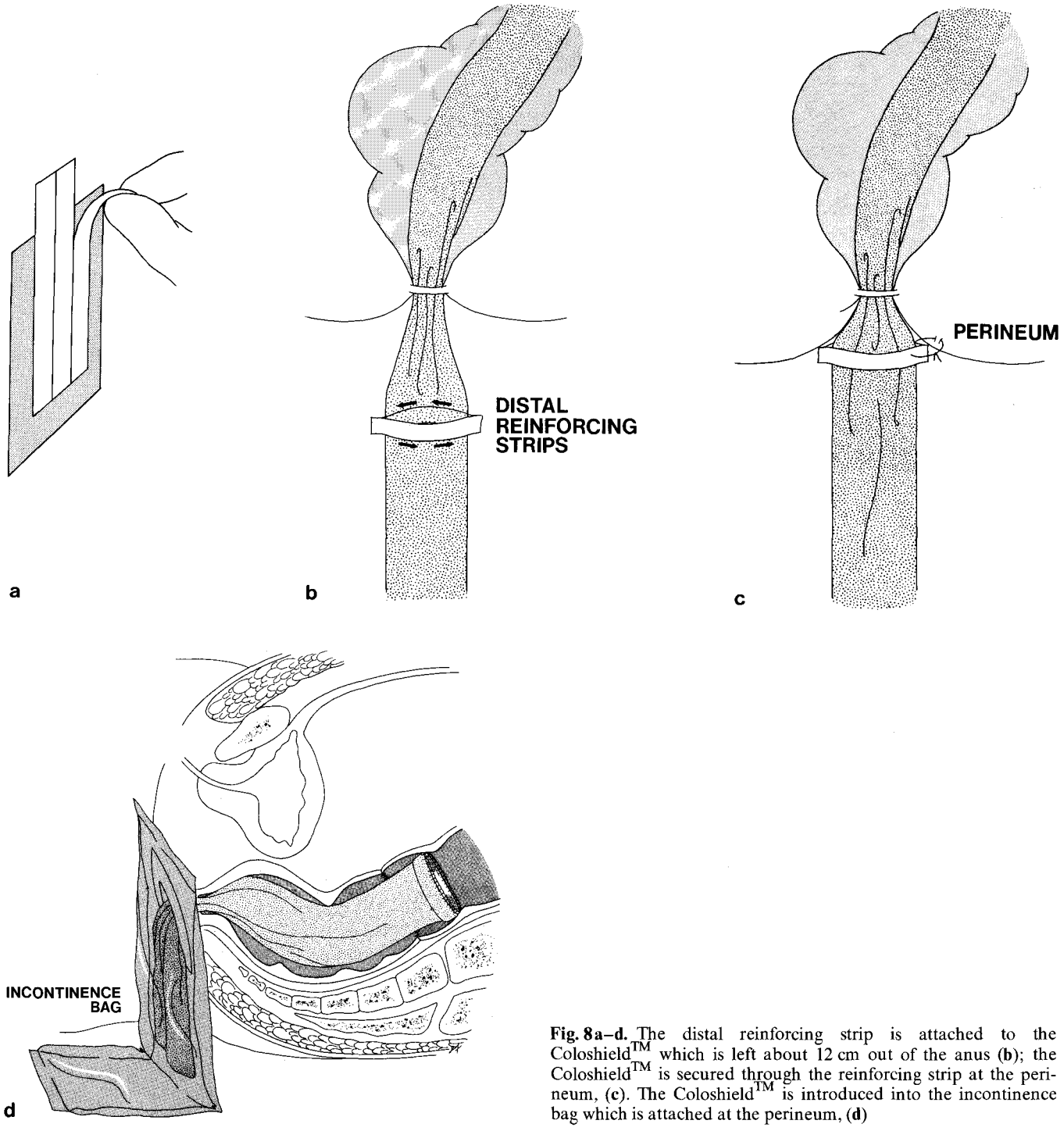


**Fig. 8a–d.** The distal reinforcing strip is attached to the Coloshield™ which is left about 12 cm out of the anus (**b**); the Coloshield™ is secured through the reinforcing strip at the perineum, (**c**). The Coloshield™ is introduced into the incontinence bag which is attached at the perineum, (**d**)

ner (Fig. 9d), fired and pulled out of the anus (Fig. 10). The tube is then cut or left out of the anus as previously described (Figs. 7, 9).

The procedure has been performed at various centers in Europe and the USA in 98 patients in a variety of conditions, including perforated diverticulitis (28 cases), obstruction of the colon (9 cases), volvulus (1 case), low anterior resection (54 cases), ileoanal anastomosis with reservoir (2 cases), bleeding diverticulosis (1 case) and persistent colonic fistulae (3 cases). Thirty-eight percent of these patients were treated as emergencies. The mortality rate was 5.4% for emergencies and 1% after elective surgery. Morbidity included wound infection (3), myocardial infarction and faecal impaction (1), ileus (1), bleeding ulcer (1), all managed conservatively. Two dehiscences following low anterior resection, after the tube had been passed per anum, were both

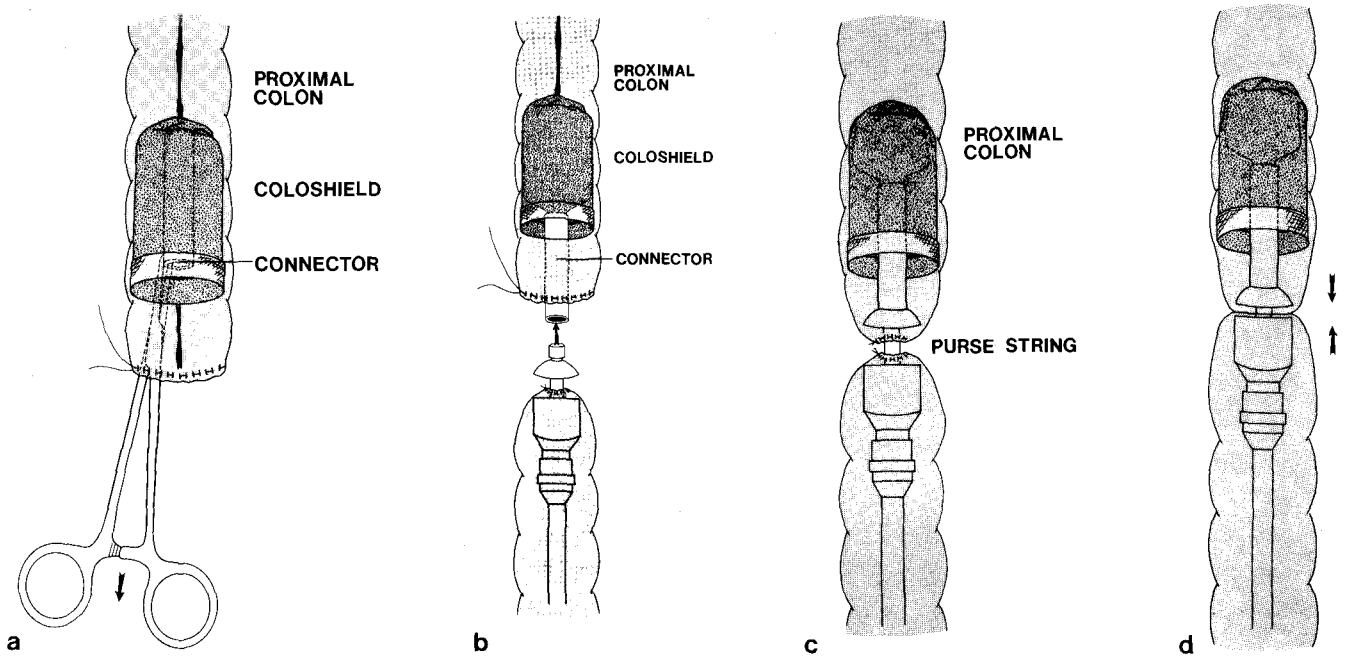


**Fig. 9.** **a** The connector is pulled out of the proximal colon after placement of the proximal purse string; **b** the connector is pushed onto the screw of the anvil; **c** the purse strings are tied down to the rod; **d** the stapler is approximated and fired

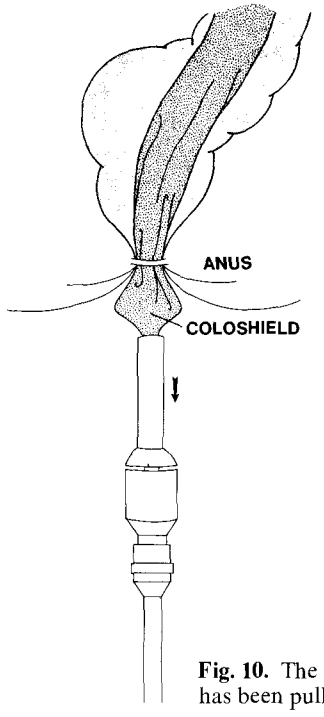


**Fig. 10.** The connector with the Coloshield™ has been pulled out the anus with the stapler

due to technical error at the beginning of our experience. The intracolonic bypass procedure can be recommended as a valuable alternative to temporary colostomy or ileostomy for protecting intestinal anastomoses. The technique is straightforward and requires minimal time and effort.

## References

1. Ravo B, Ger R (1984) Intracolonic bypass by an intraluminal tube: an experimental study. Dis Colon Rectum 27:360–366
2. Ravo B, Ger R (1984) A preliminary report on the intracolonic bypass as an alternative to a temporary colostomy. Surg Gynecol Obstet 159:541–545

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