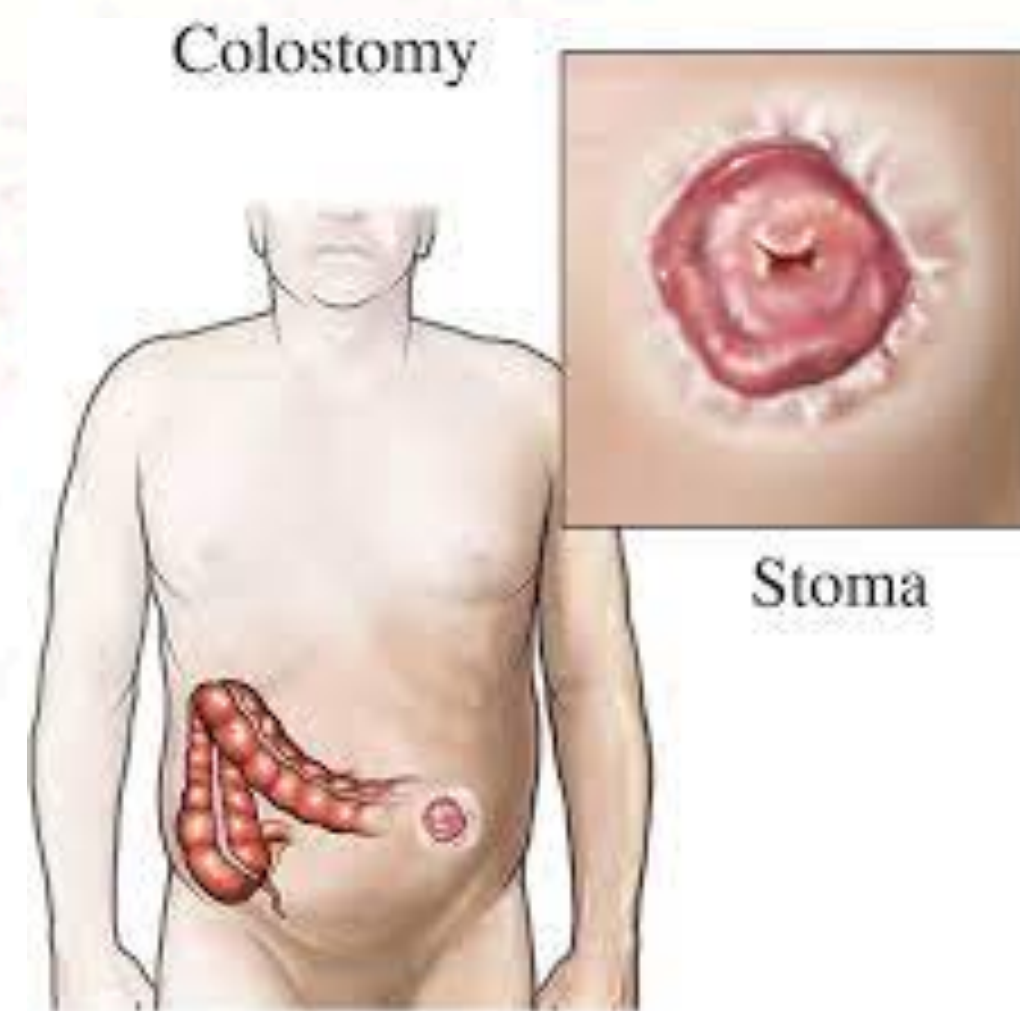


Stomas of the Small and Large Intestine

R2 Chayutra Intragumheang

History

- stoma originates from the Greek **stomoun (opening or mouth)**.
- In 18th century, intestinal stomas considered as method of treating intestinal obstruction.



History

- Understanding of stomal physiology and of specialized enteral and parenteral nutrition, the diagnosis and management of stoma-related complications, have paralleled the advances in technique significantly improving outcome.

History

- earlier diagnosis, improved surgical approaches, and perioperative care, pediatric surgeons were able to safely perform more single-stage procedures,
- **decreasing the need for preliminary decompressing enterostomies** (ileostomies and colostomies).
- increasing number of children with a variety of complex pathologies, there has been a **greater demand for upper gastro-intestinal access** for long-term enteral feeding (gastrostomies and jejunostomies), as well as **lower intestinal access for antegrade enemas** (appendicostomies, tube cecostomies, and tube sigmoidostomies).

Child with a stoma

- An enterostoma in a child is a **major disruption of normality** and frequently leads to substantial **psychologic trauma** for the child and parents.
- However, most **decompressing intestinal stomas** in the pediatric age group are **temporary**
- **noncorrectable** and crippling pathologic conditions of the lower intestinal tract, a **permanent**, well-functioning stoma contributes to an improved quality of life.

Child with a stoma

- **carefully evaluating the child's pathologic condition**
- health status
- **weighing the pros and cons** of diversion
- planning ahead (for eventual closure)

Child with a stoma

- **pediatric factors** : anatomic and physiologic differences, delicate structures, growth, physical and emotional maturity, preoperative preparation
- quality of life of a patient with a stoma is related to the quality of stoma.
- more than 1/2 of all stomas are placed in the neonatal period
- 1/4 in infants younger than 1 year of age

Type of Enterostomas

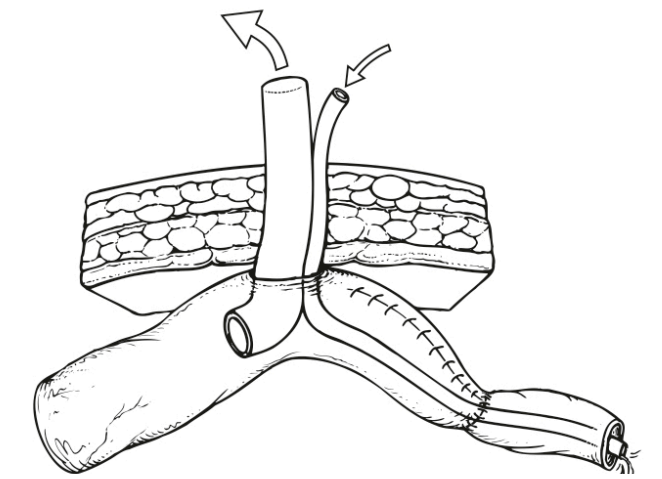
Applications and Considerations for Enterostomas

Administration of Feedings, Medication

- **Without entering the jejunal wall** : nasojejunal tube, gastrostomy- jejunostomy tube
- **Access through the jejunal wall** : tunneled catheter, needle catheter, T-tube, button
- **Isolated jejunal loop brought directly to abdominal wall** : Roux-en-Y

Proximal Decompression and Distal Feedings

- **Gastrostomy and distal feeding tube** : same stoma or separately.
- **Double-lumen tube** in dilated proximal jejunum **with feeding end** across an anastomosis
 - two single-lumen tubes inserted separately into divided
 - closed loops of small intestines
- **Divided intestinal segments brought directly to skin level**, with pouch applied to proximal stoma and feeding catheter inserted into distal.



Antegrade Irrigation

- **Appendix or other intestinal conduit** brought to abdominal wall for intermittent catheterization
- **Catheter, T-tube, skin level device placed in intestinal lumen**

Decompression, Diversion, or Evacuation

- **End stoma, single opening**
- **Double-barrel stoma**
- **End stoma with an anastomosis below the abdominal wall** Loop over a small rod or skin bridge
- **Closed loop with catheter** or open loop with occluding valve-type device allowing controlled egress
- Special stomas such as a catheterizable pouch

Type of Enterostomas

Enterostoma Exit

Proximal Stoma

Through celiotomy incision

Through separate opening

With proximal and distal limbs close to each other

With proximal and distal openings apart

Multiple stomas

Variations of the above

Distal Stoma

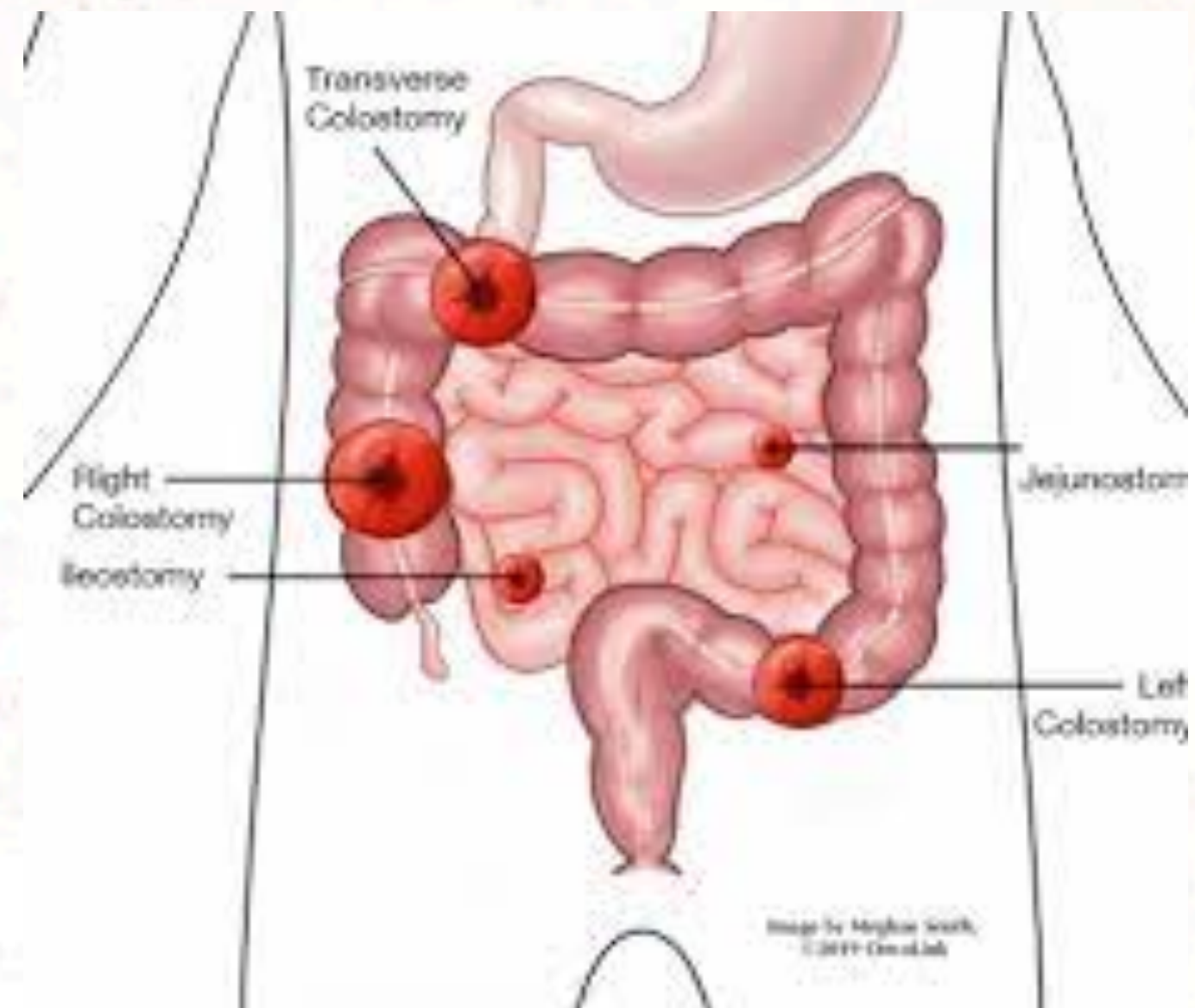
Exteriorization as mucus fistula adjacent to or separate from proximal intestine

Partial closure and placement next to the proximal stoma⁹²

Closure and replacement into abdominal cavity

Closure after placement of a catheter for subsequent access for irrigation or contrast studies

Type of Enterostomas



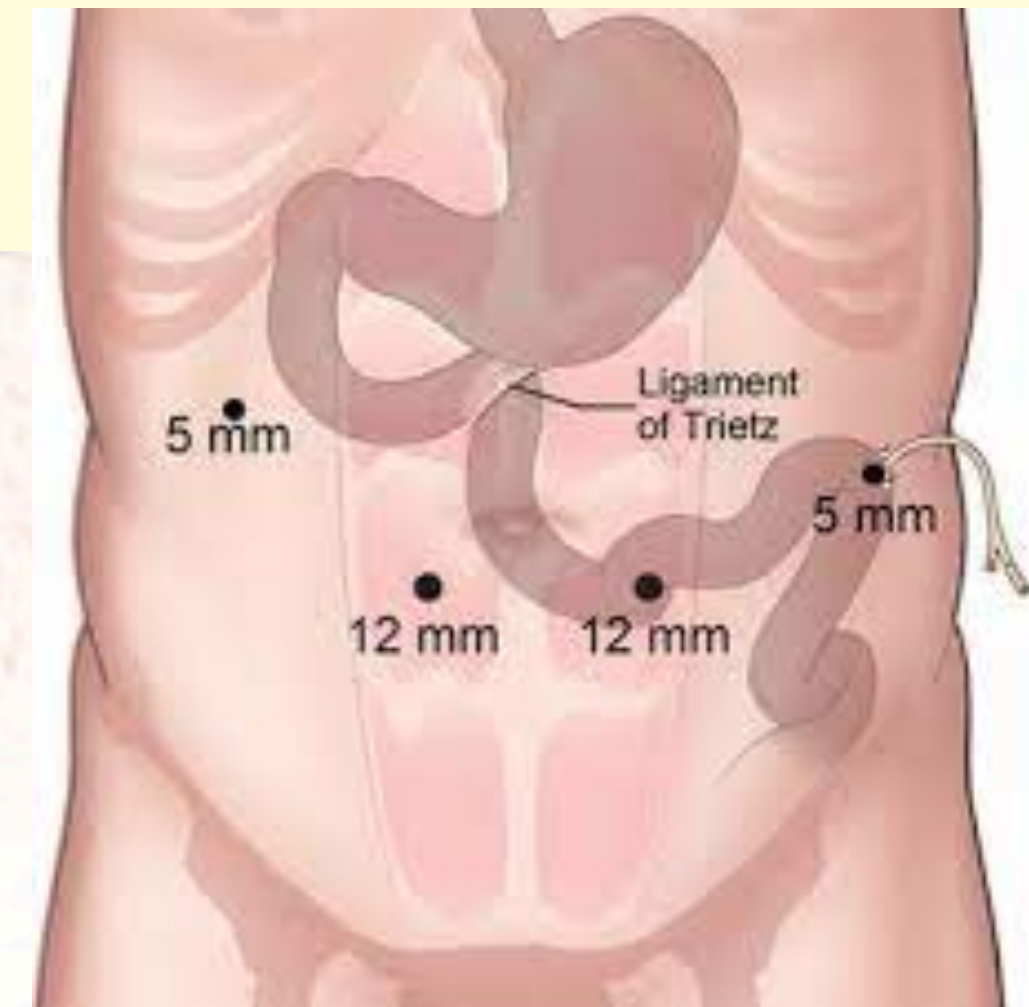


JEJUNOSTOMY

JEJUNOSTOMY

Indication

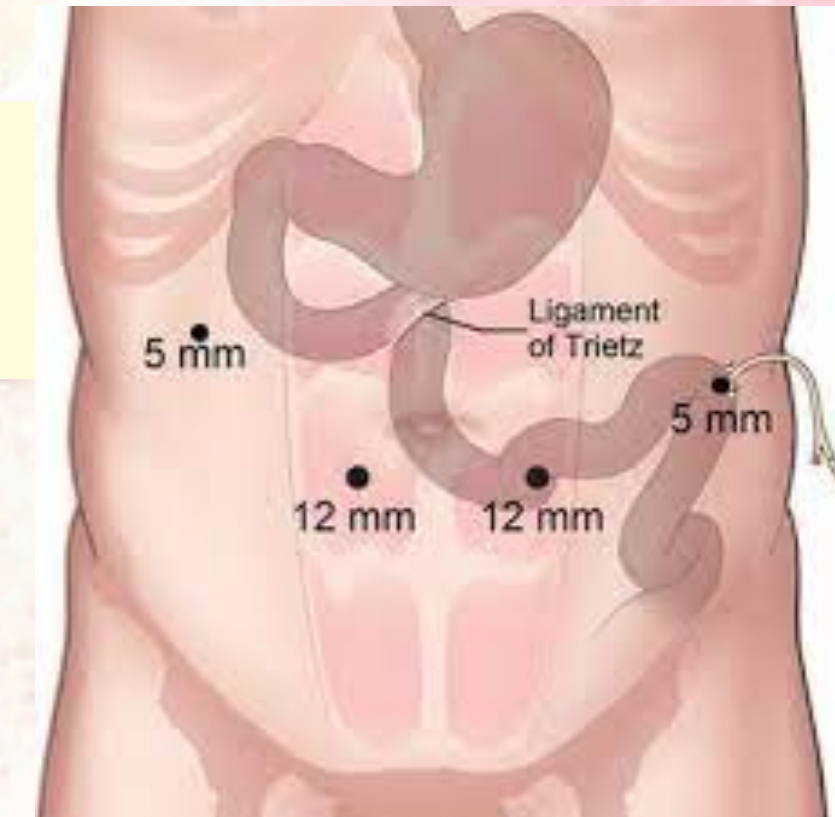
- **Indirect access to the jejunum**
 - naso-jejunal
 - gastro-jejunaladequate for **short or intermediate-length nutritional support.**
- **Direct access to the proximal small bowel**
 - For **long term enteral alimentation**
 - as an alternative to a gastrostomy, which is the preferred route.



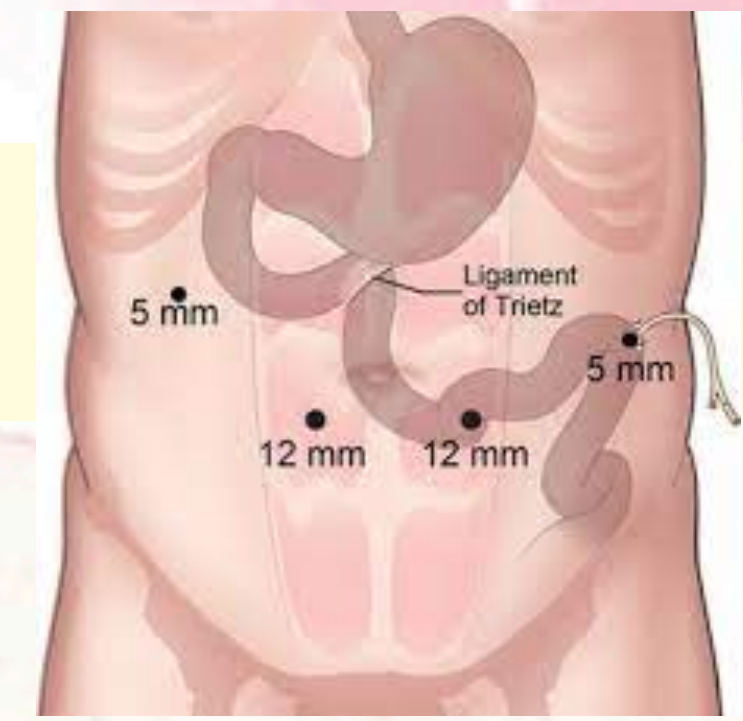
JEJUNOSTOMY

Indication

- **neurologically impaired** children
- complex medical problems associated with **foregut dysmotility**.
- acute surgical problems benefiting from early enteral nutrition
 - **major trauma**
 - **burn**
 - **children needing long-term supplemental feedings**



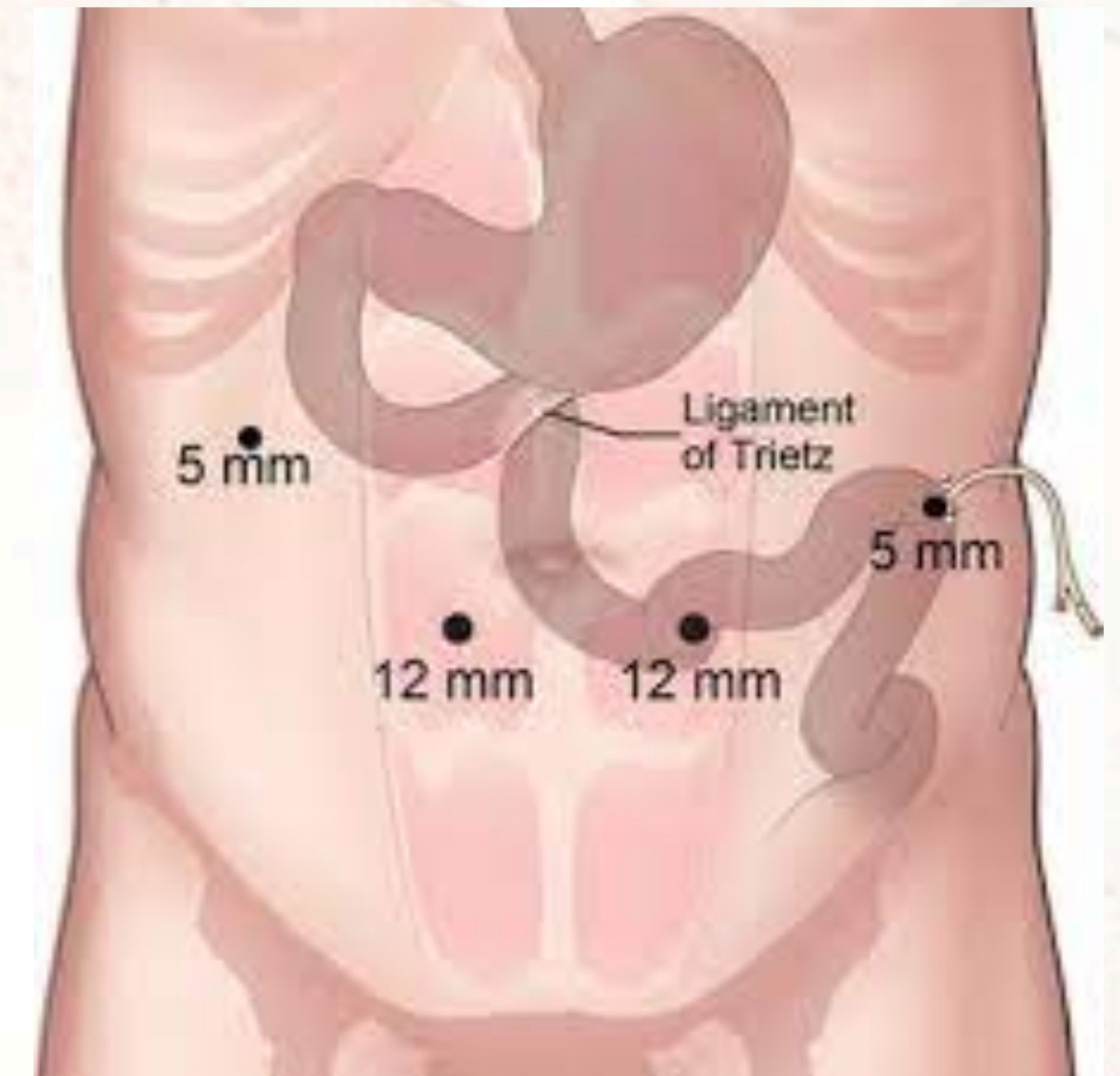
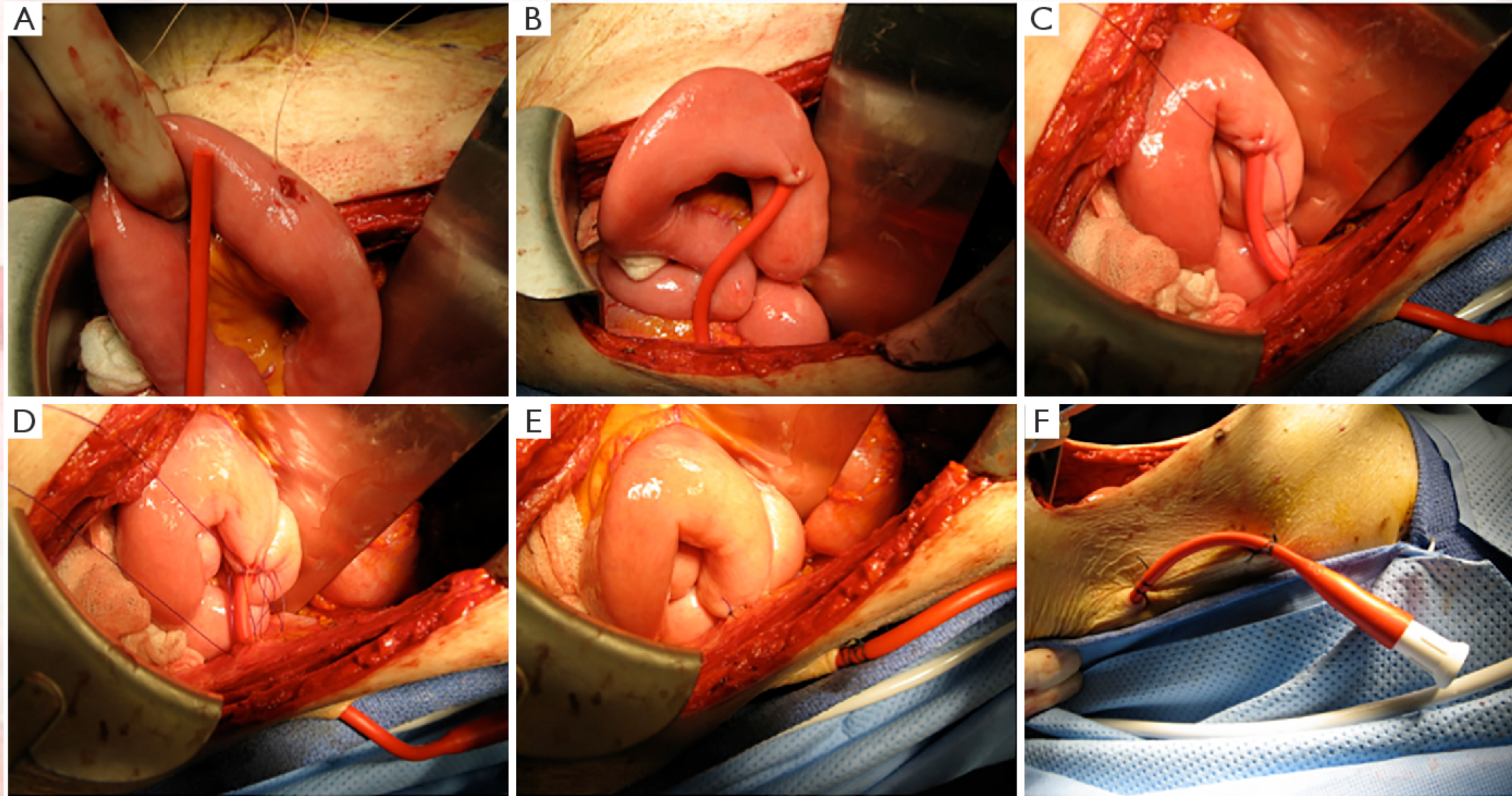
JEJUNOSTOMY



Indication

- use of a segment of intestine or drainage device interposed **between the gallbladder and the abdominal wall for drainage of bile**
 - some types of **genetic cholestatic syndromes**.
- **other segments of the intestine**, exteriorization or tube decompression
 - **following bowel resection when a primary anastomosis is unsafe or impossible** (e.g., **necrotizing enterocolitis, midgut volvulus**).

Technical Aspects

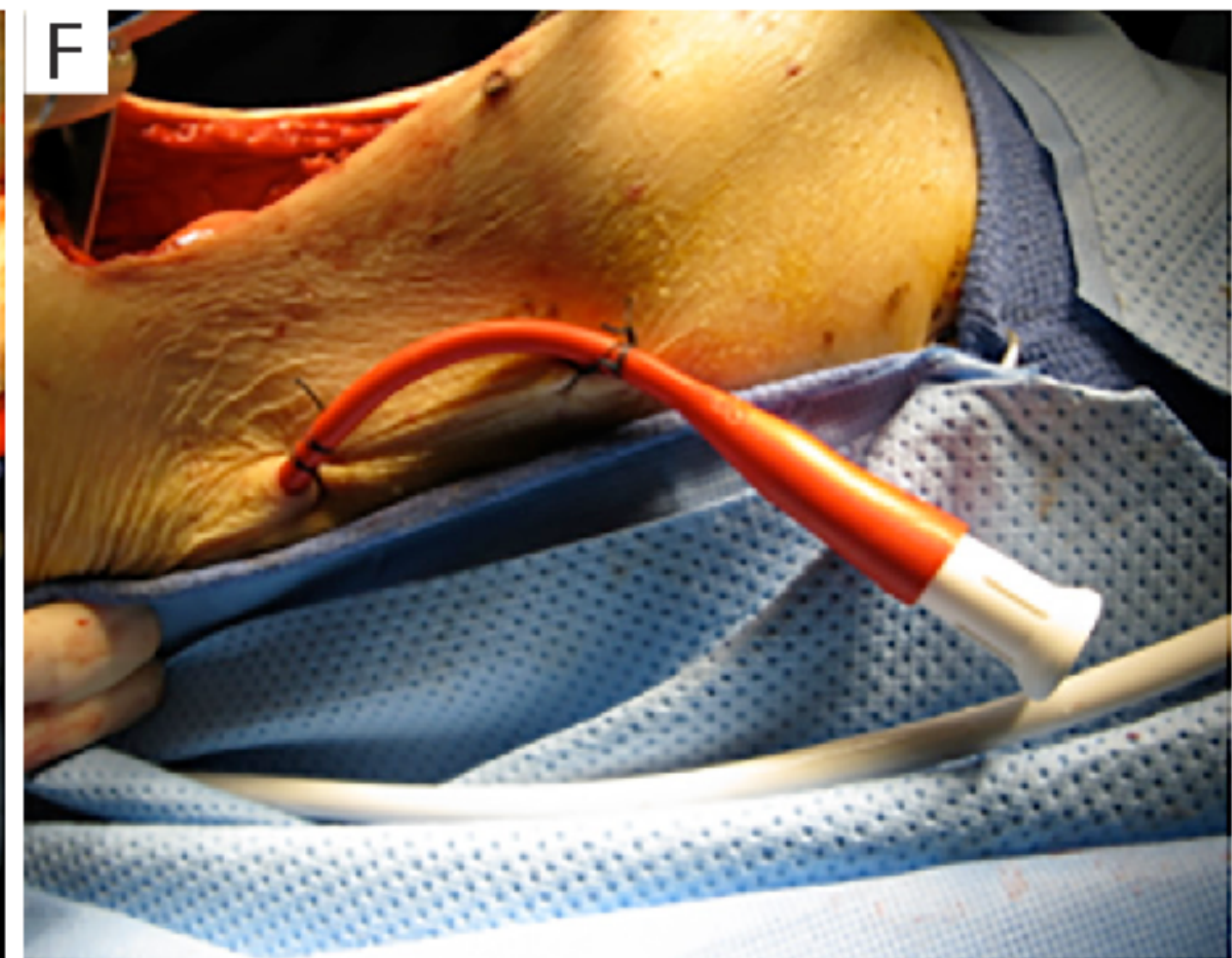
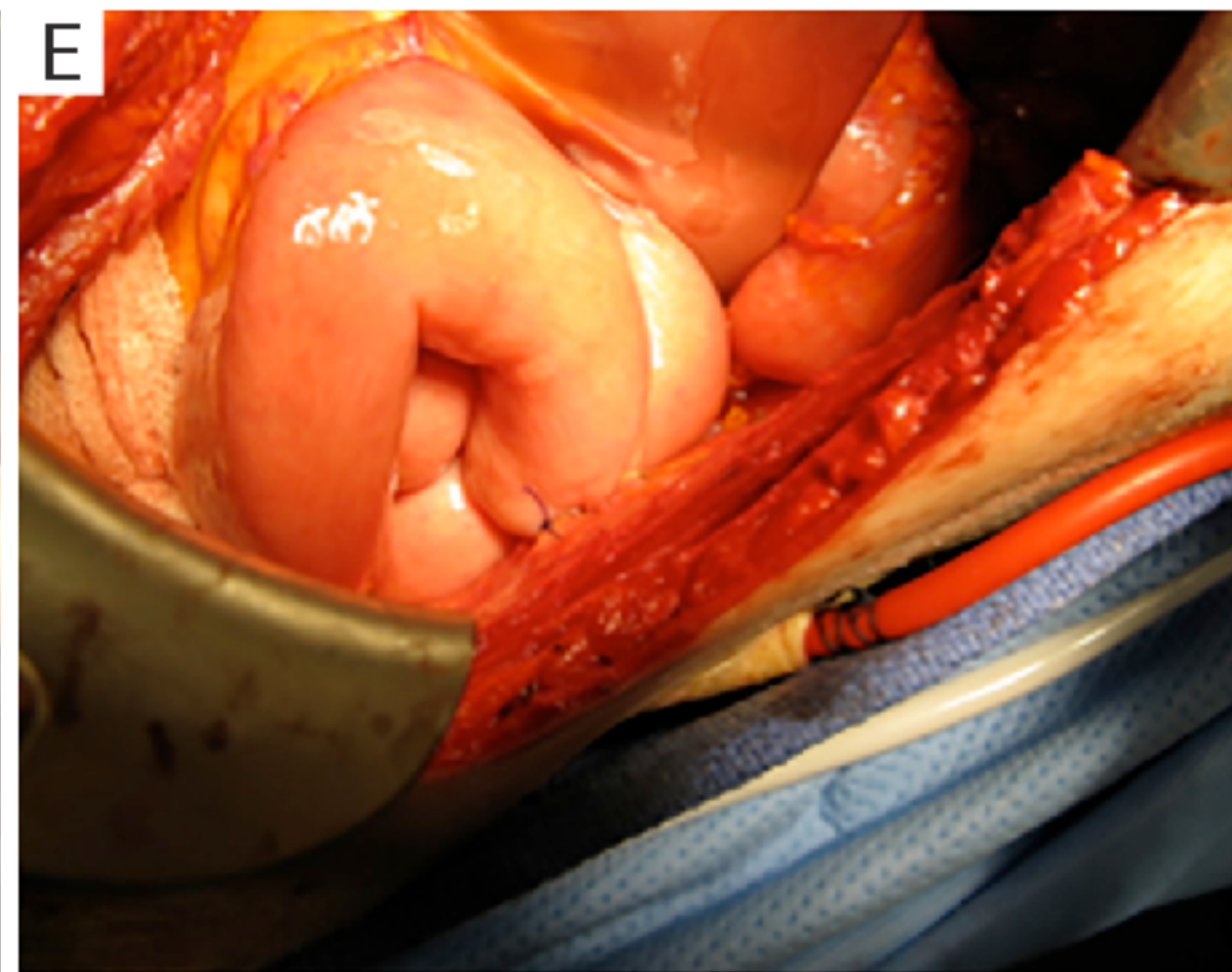
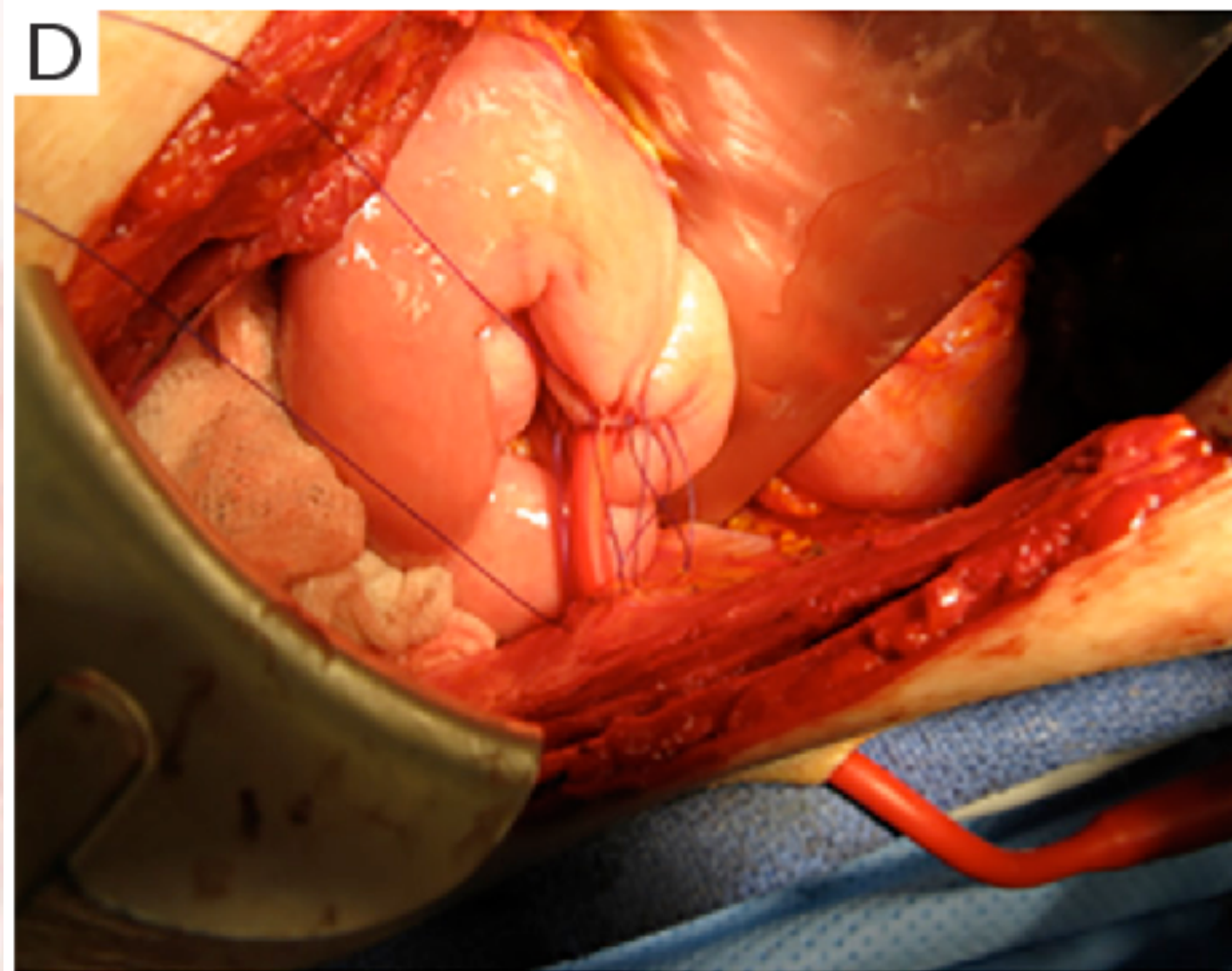
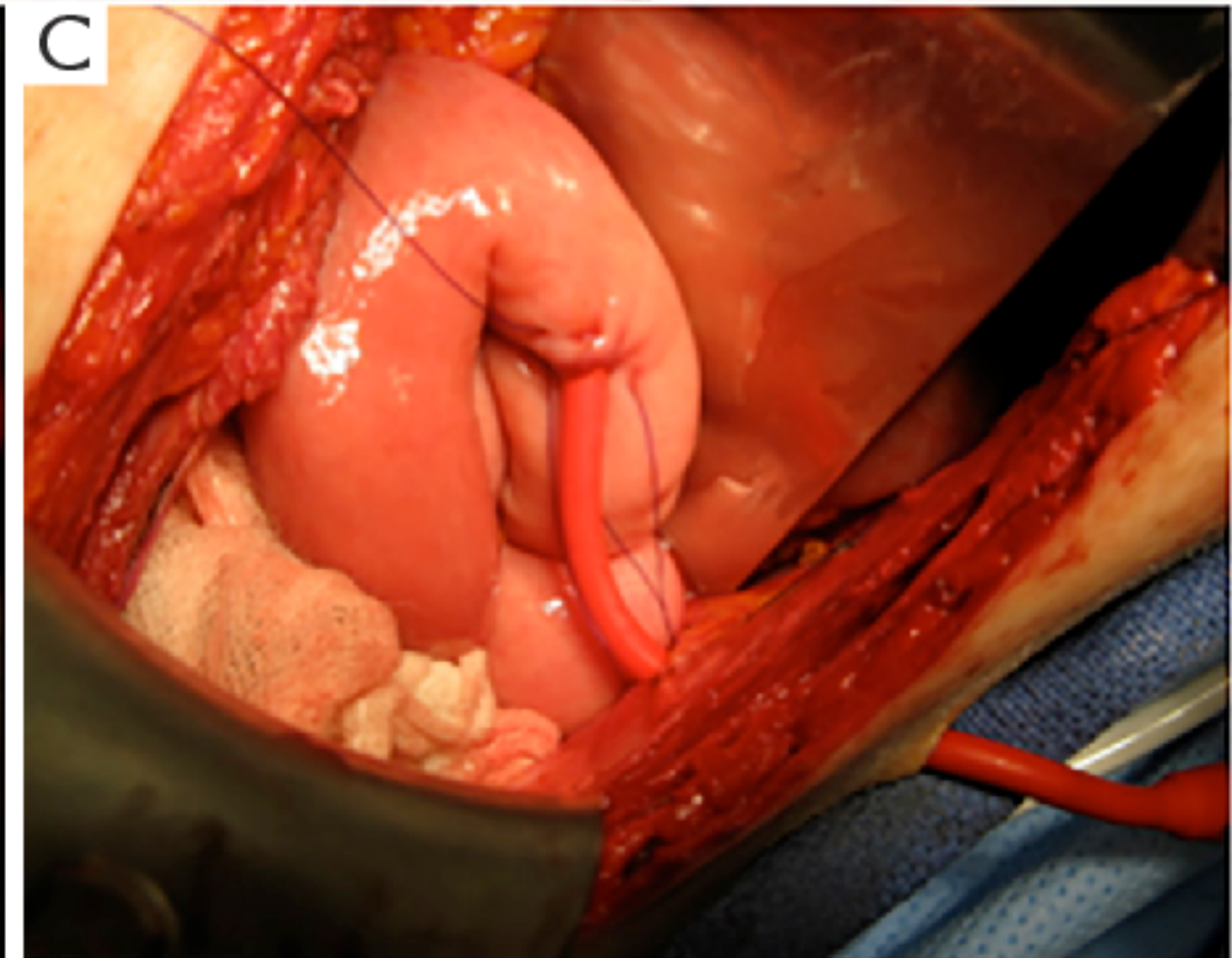
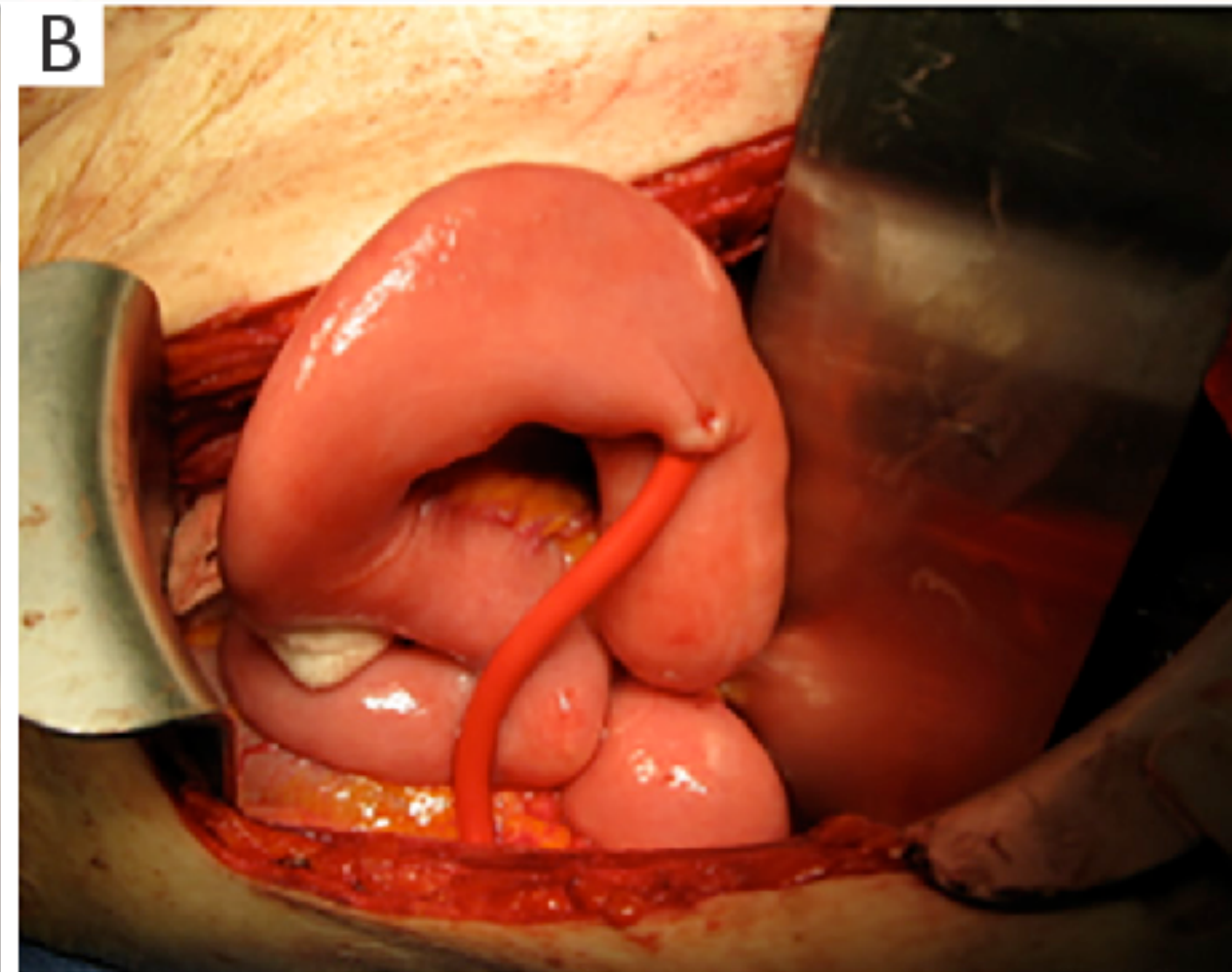
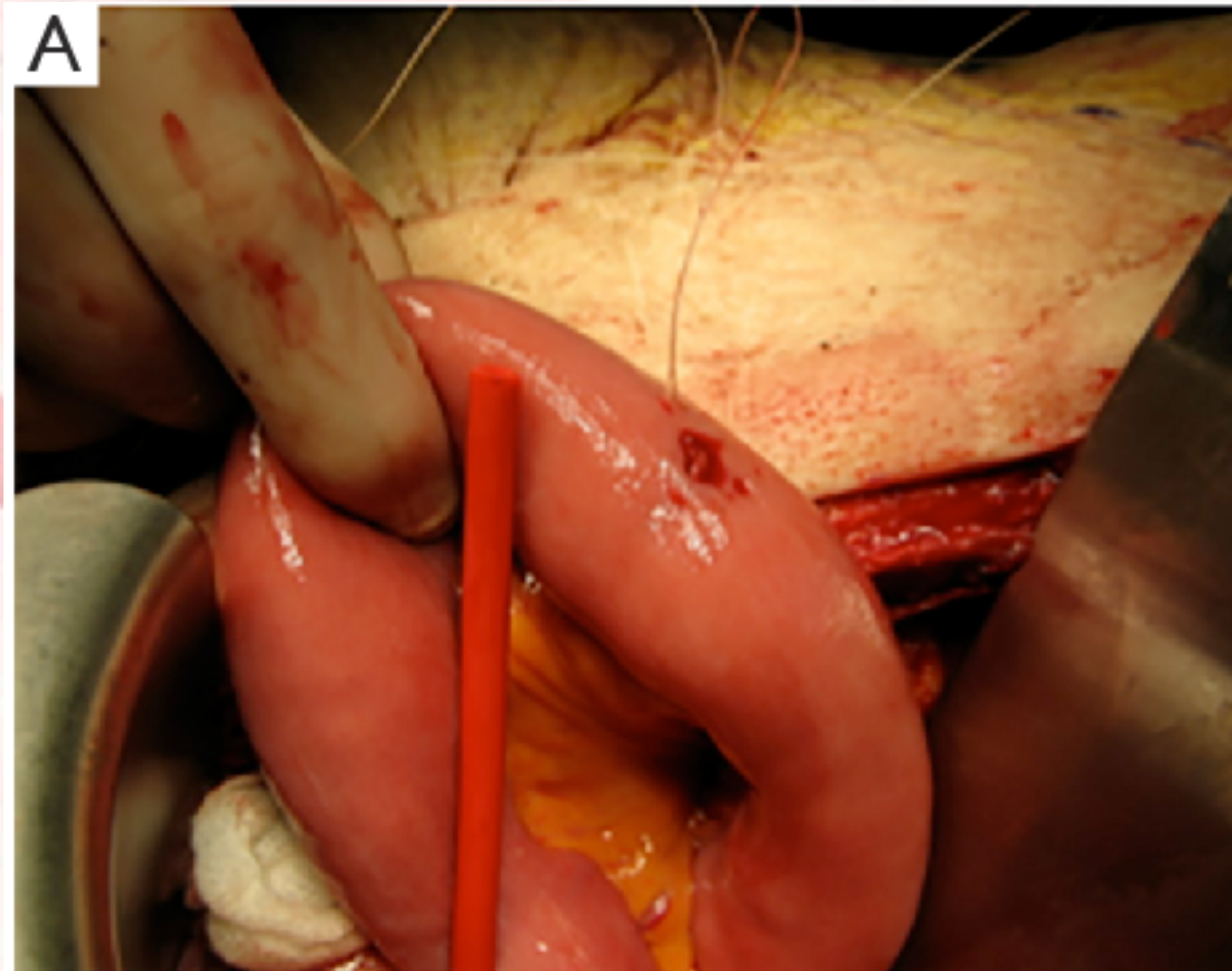


- generally placed in the **left upper abdomen, slightly above the umbilicus**
- not so cephalic as to interfere with a possible gastrostomy and/or fundoplication.

Technical Aspects

- **1. open technique**
 - upper left quadrant incision.
 - **ligament of Treitz is identified**
 - the catheter or skin-level device is inserted in the antimesenteric **10 - 20 cm distal to the duodeno-jejunal junction.**
 - A **purse-string** suture of absorbable material is placed
 - The catheter or skin-level device is then brought out
 - A **second purse-string suture**
 - sutures alternating between the intestine and the exit site of the catheter in the abdominal wall.
 - When tied, this second suture approximates the intestinal serosa to the parietal peritoneum in a watertight manner.

Technical Aspects



JEJUNOSTOMY

FEEDING JEJUNOSTOMY TECHNIQUE

2. Direct percutaneous endoscopic jejunostomy (PEJ) is applicable to older patients but difficult in small children due to limitations by the endoscopic equipment.

- intraluminal bumper must be size appropriate.

3. Laparoscopic or laparoscopically assisted techniques are now used with increasing frequency in all age groups.

- Bringing loop to the abdominal wall
- placing a skin-level access device is simple and effective.
- **Peristomal leakage** is always a concern. An alternative intended to decrease this problem is Roux-en-Y approach. But can lead to volvulus and internal hernias with intestinal obstruction.

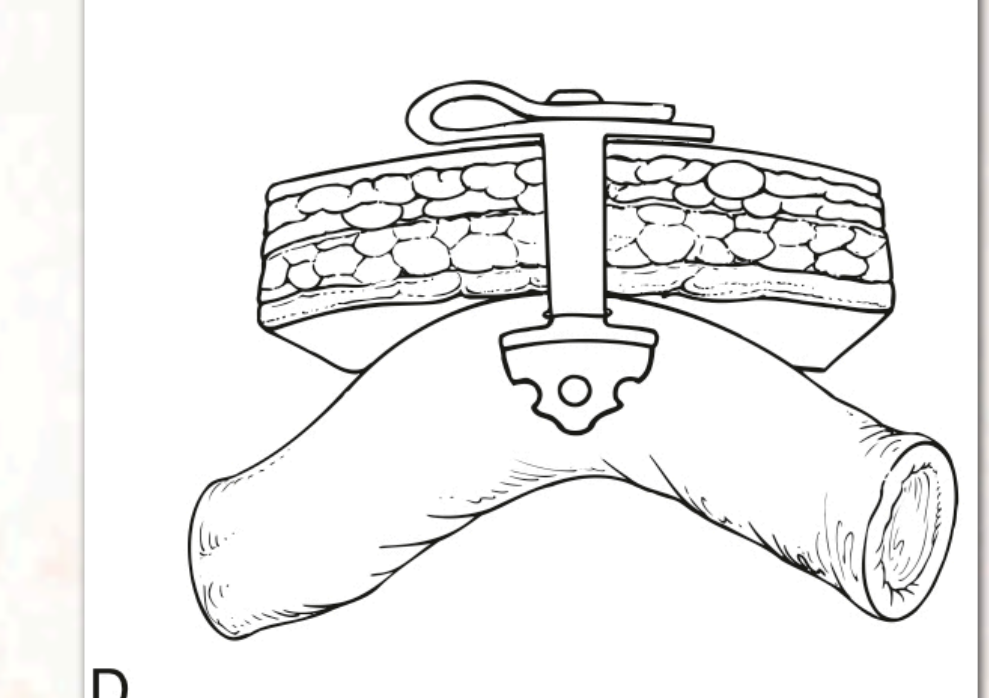
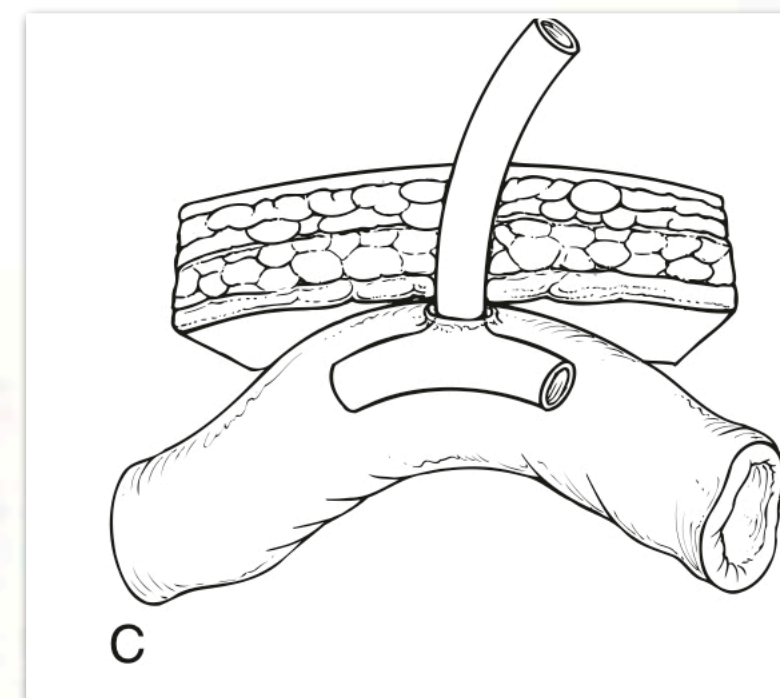
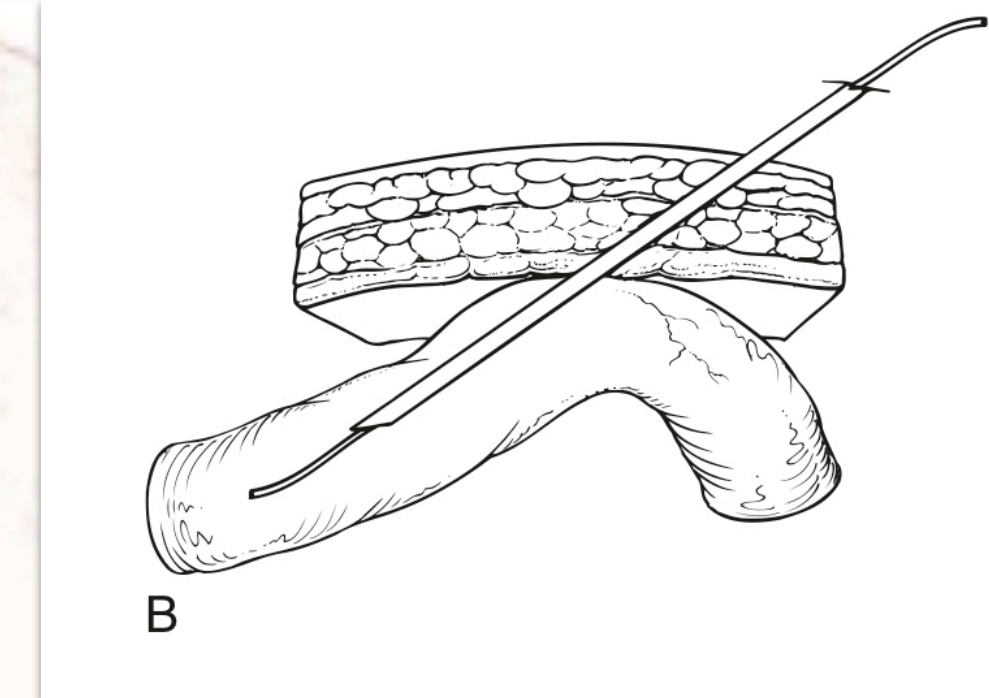
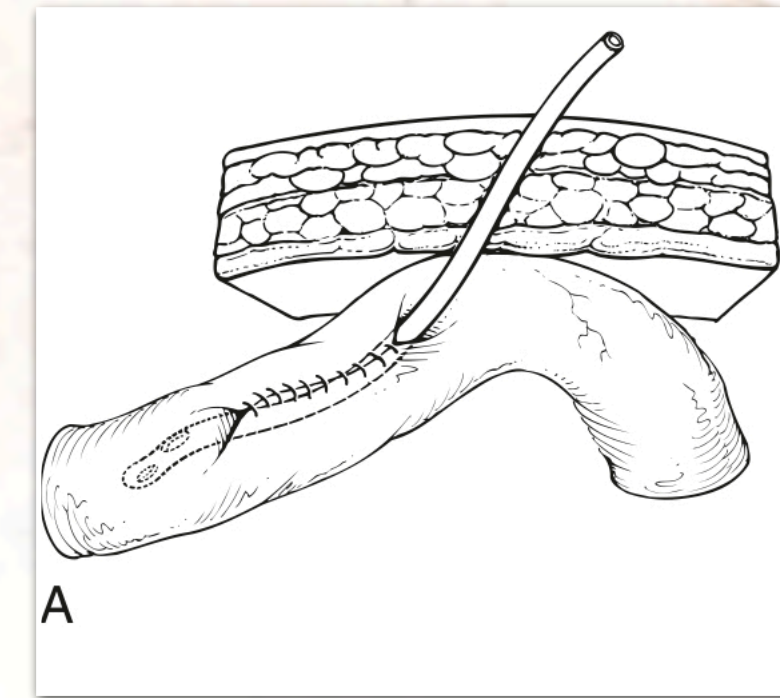
JEJUNOSTOMY

Access device choice

- depends on the **type of stoma** , **child age**.
- Non balloon , balloon

Non balloon

- **because it does not obstruct the narrow lumen**
- Because **straight catheters** can be difficult to immobilize or replace in conventional tunneled jejunostomies
- a good **alternative is a T-tube** for infants or other nonballoon skin-level device for older pediatric patients.



JEJUNOSTOMY

Non balloon type

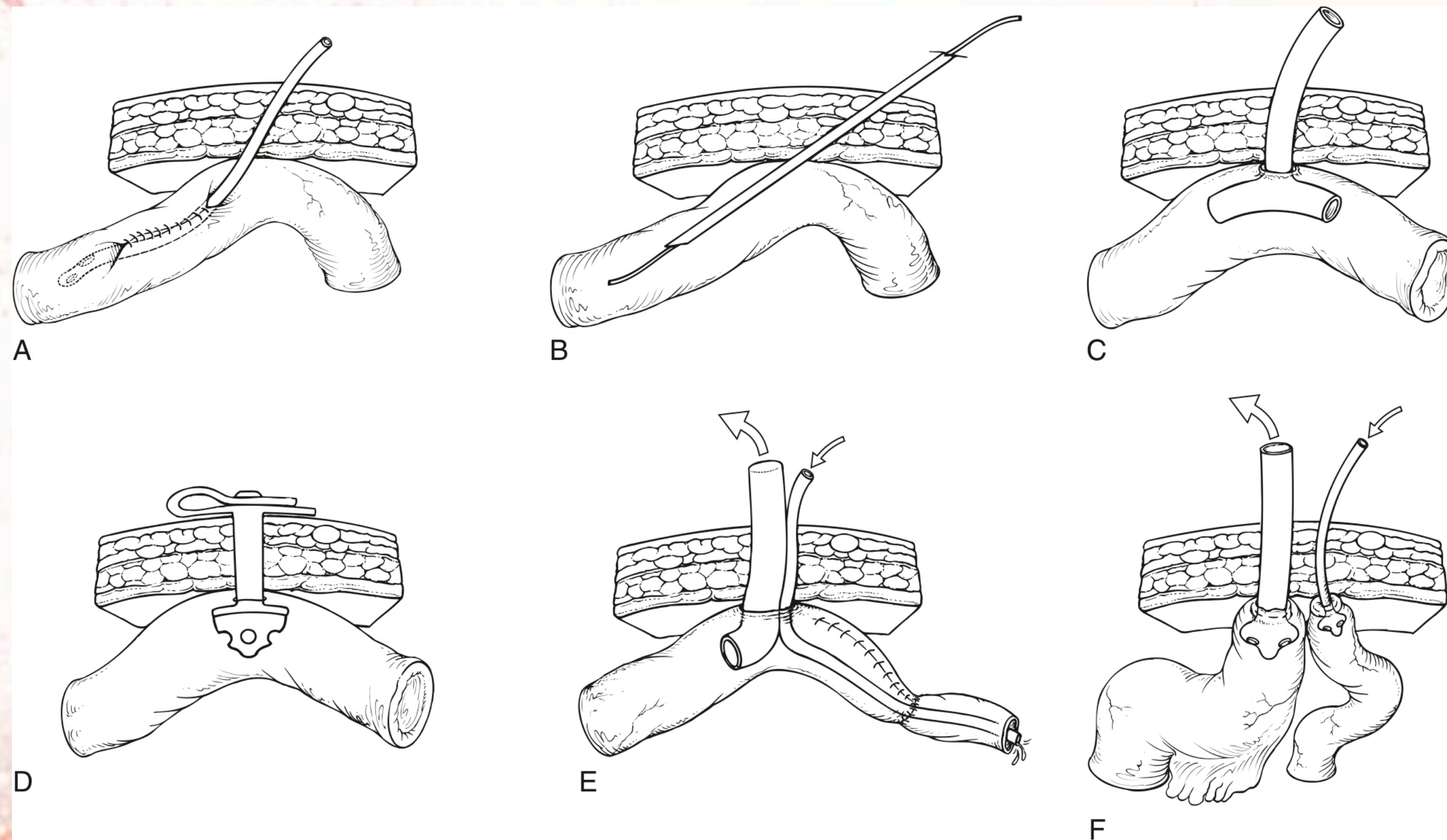


FIGURE 98-1 Diagrams of select-feeding and decompressing-feeding jejunostomies. **A**, Tunneled catheter.⁹ **B**, Needle catheter.⁹ **C**, T-tube.⁸² **D**, Button.¹⁰⁰ **E**, Proximal decompression and distal feeding across an anastomosis.¹⁹ **F**, Temporary decompression feeding using catheters when primary anastomosis is unsafe and intestinal exteriorization is undesirable or not possible.⁸¹

JEJUNOSTOMY

Balloon-type devices are suitable for the Roux-en-Y loop. As with a gastrostomy, these devices are both **replaceable**.

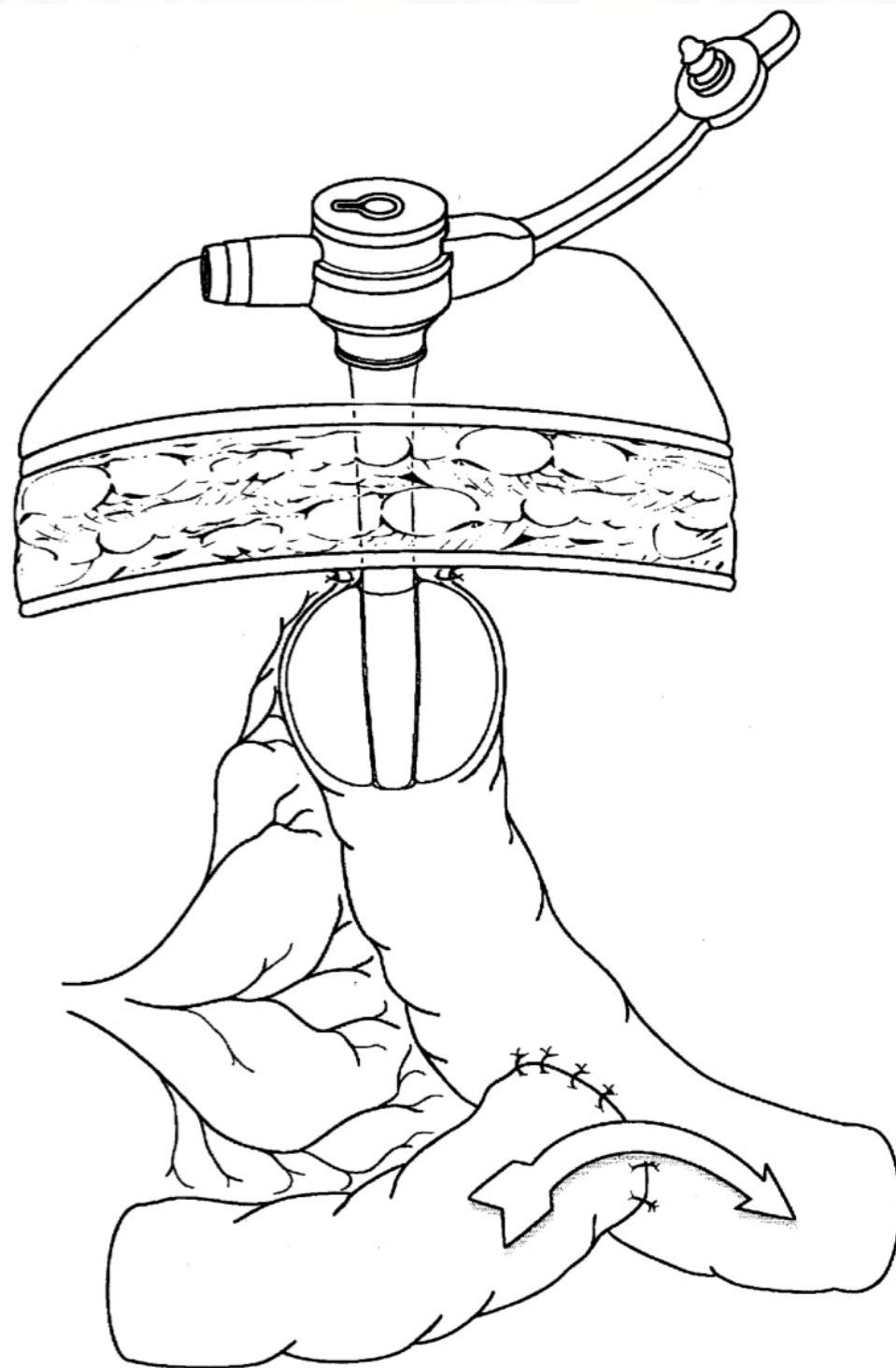


FIGURE 98-2 Roux-en-Y feeding jejunostomy with a balloon-type skin-level access device.¹⁰⁸

The background is a soft watercolor illustration. It features a white dove in flight, positioned in the upper right quadrant. The scene is decorated with delicate pink and orange floral motifs, including leaves and blossoms, scattered across the light-colored background. A central yellow rectangular box contains the text.

ILEOSTOMY

ILEOSTOMY

Indication

- neonates with **distal intestinal obstruction**
 - long segment Hirschsprung disease
 - complex meconium ileus
 - gastroschisis with atresia.
- **divert bowel contents when reestablishing bowel continuity is precluded by peritonitis, ischemia, or hemodynamic instability (e.g., neonatal necrotizing enterocolitis)**

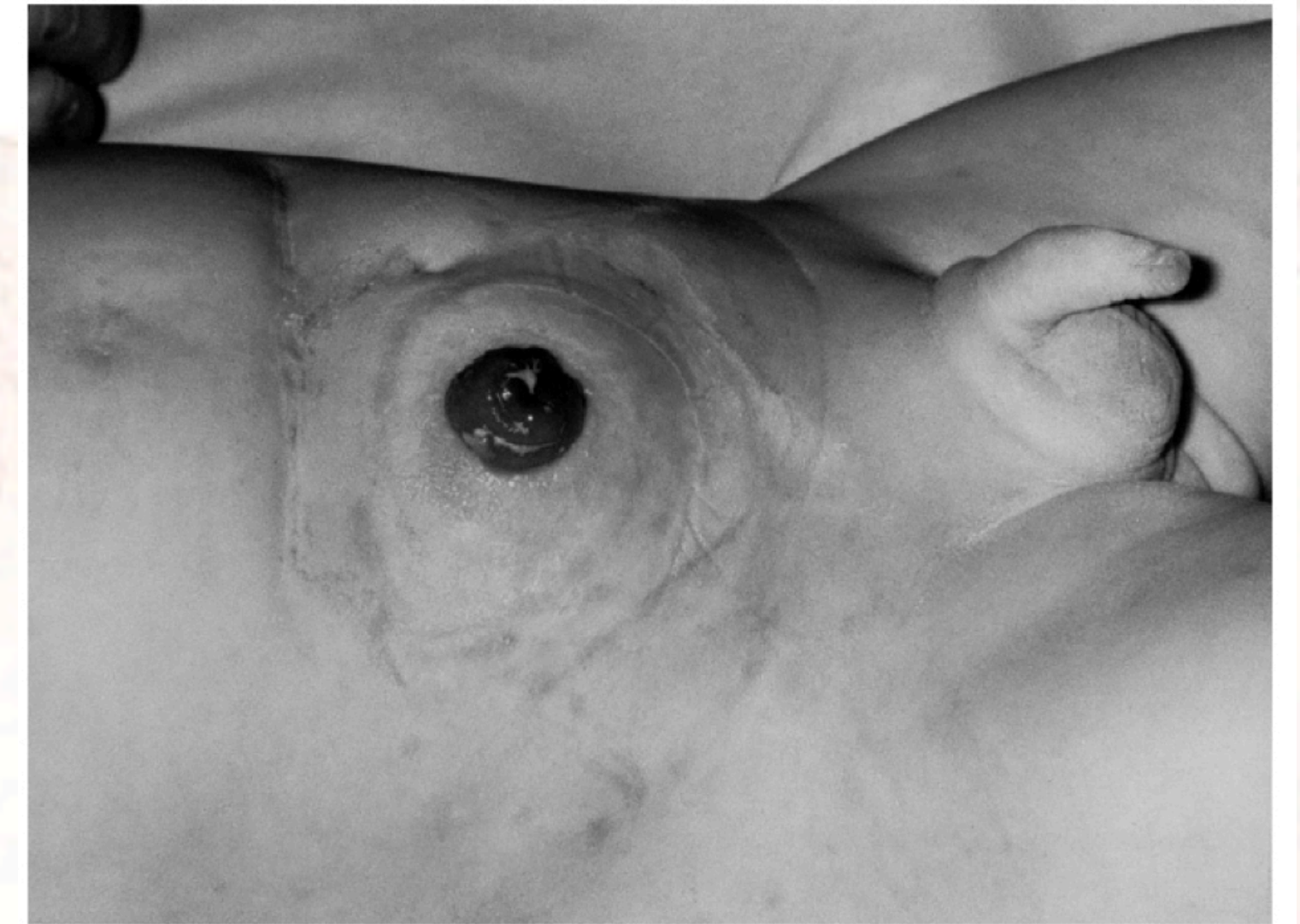


FIGURE 98-6
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FIGURE 98-7 Same child as in [Figure 98-6](#) in a sitting position. Notice the deep crease produced by the transverse supraumbilical incision. A stoma brought out through such an incision would have precluded proper use of the pouch, and a revision would have become necessary.

ILEOSTOMY

2. Indication for ILEOSTOMIES

- Ileal diversion used in **colonic pathology** **ulcerative colitis, familial polyposis** as temporary, protective, or, permanent stomas.
- Less common indications
 - other forms of inflammatory bowel disease
 - rare manifestations of colonic dysmotility
 - monitoring of the intestinal graft in patients with small bowel transplantation.

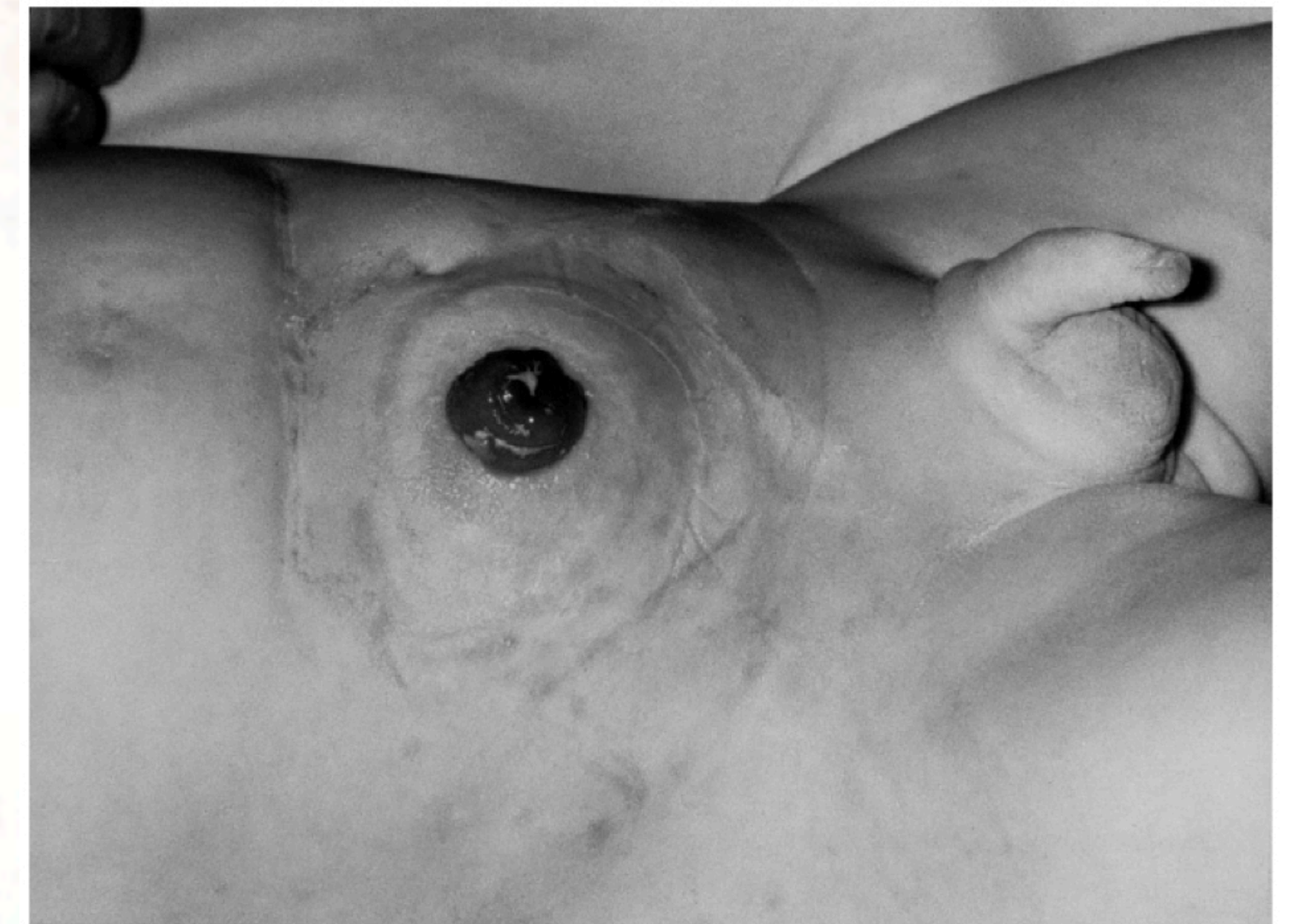
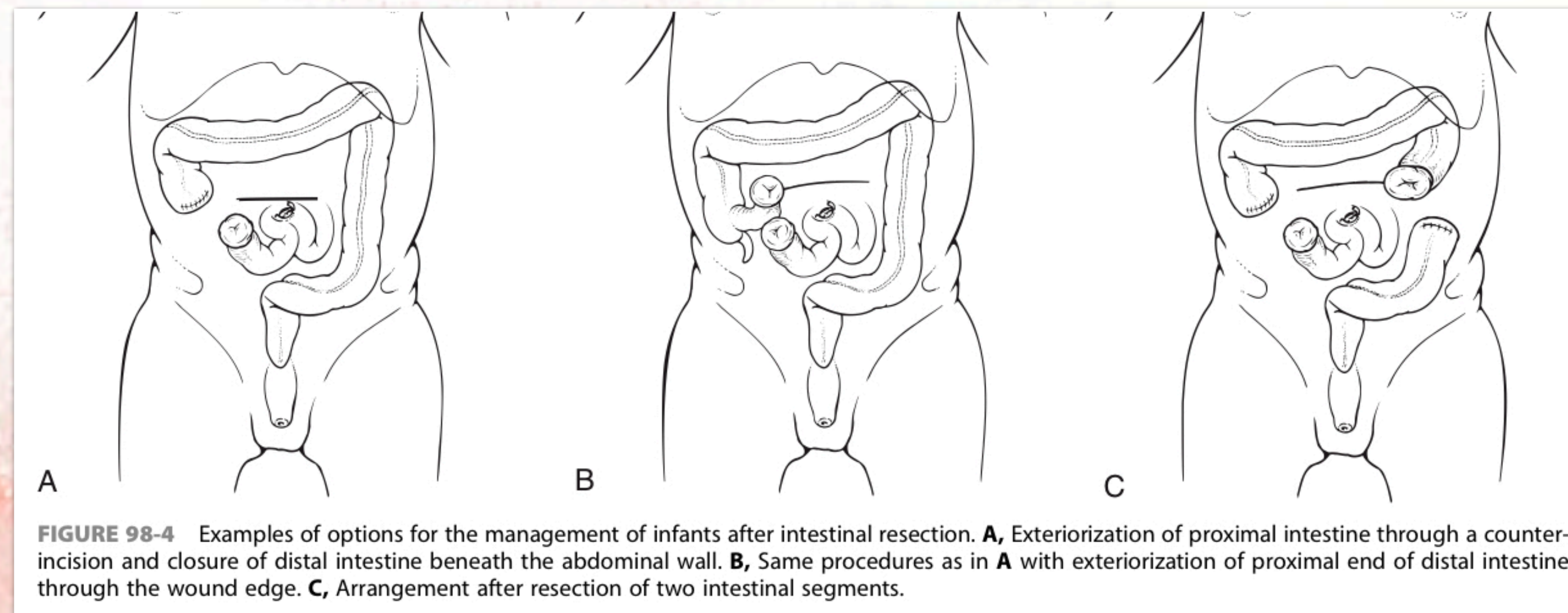


FIGURE 98-6 One-year-old boy with severe necrotizing enterocolitis with loss of distal ileum and colon down to the peritoneal reflection before reanastomosis. Liquid stools precluded earlier reestablishment of intestinal continuity. Notice the appliance mark and the appropriate distance from the incision, the umbilicus, the inguinoabdominal fold, and the right anterior superior iliac spine.

ILEOSTOMY

2. ILEOSTOMY

- **After intestinal resection** (such as **necrotizing enterocolitis**)
- Surgeon prefer : **single-end stoma** through a counter incision .
- alternative : bring the **proximal intestine through the end of the incision**
-wound complications are more common.
- if the stoma must remain for a prolonged period of time and the child gains weight, the **fold created by the laparotomy incision may interfere with fitting of the stoma appliance**

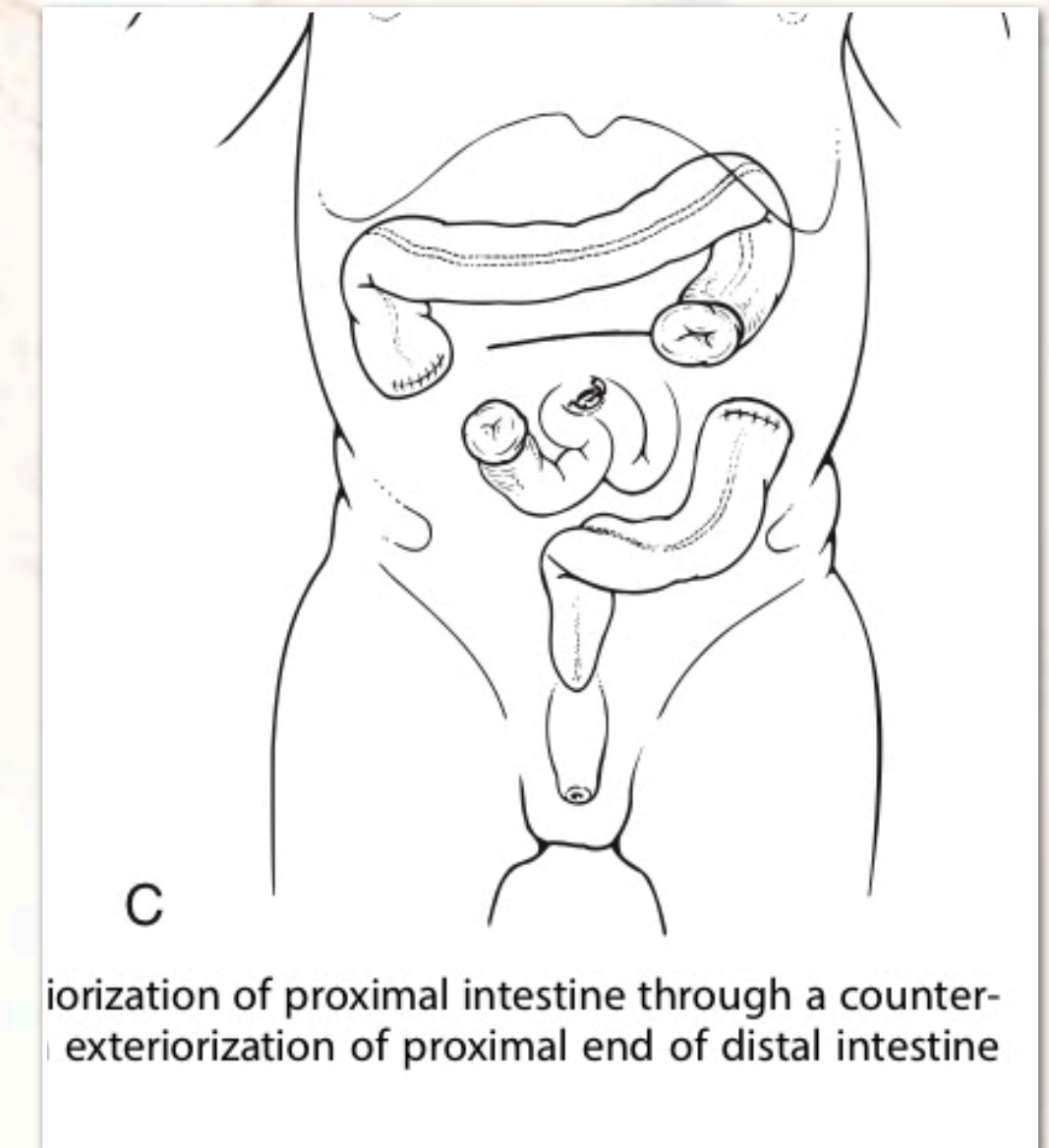


ILEOSTOMY

2. ILEOSTOMY

Distal limb

- With a **healthy distal intestine** and **downstream patency**, the **distal limb may be closed** and placed intraabdominally adjacent to the proximal stoma.
- exteriorization as a mucus fistula is prudent
- use **loop stoma rather than end stoma** is an alternative in which the **intact mesentery provides maximal perfusion**.
- A **double-barreled stoma** is a time-honored.
- To save as much intestine as possible, the placement of **multiple stomas** may be necessary
- **T-tube ileostomies** have been useful for the instillation of liquefying solutions.



ILEOSTOMY

2. ILEOSTOMY

- **ulcerative colitis, familial polyposis**

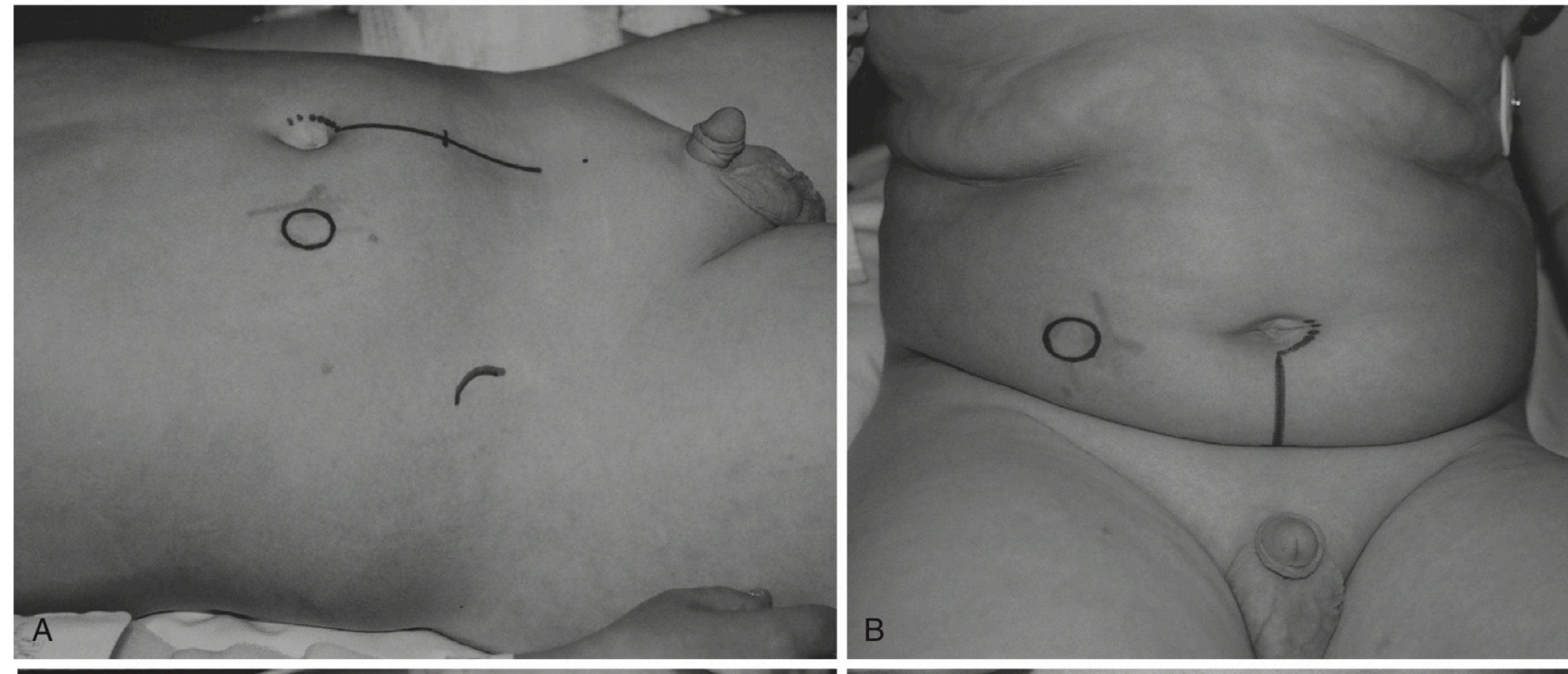
Choices for a temporary protective diverting ileostomy

- simple loop
- end (distally closed) loop
- end stoma, with the closed distal end under the fascia

ILEOSTOMY

- **Decompressing ileostomies**

- right lower quadrant
- The umbilicus is a possible site for a stoma
- excellent choice for the distended proximal intestine in gastroschisis with atresia

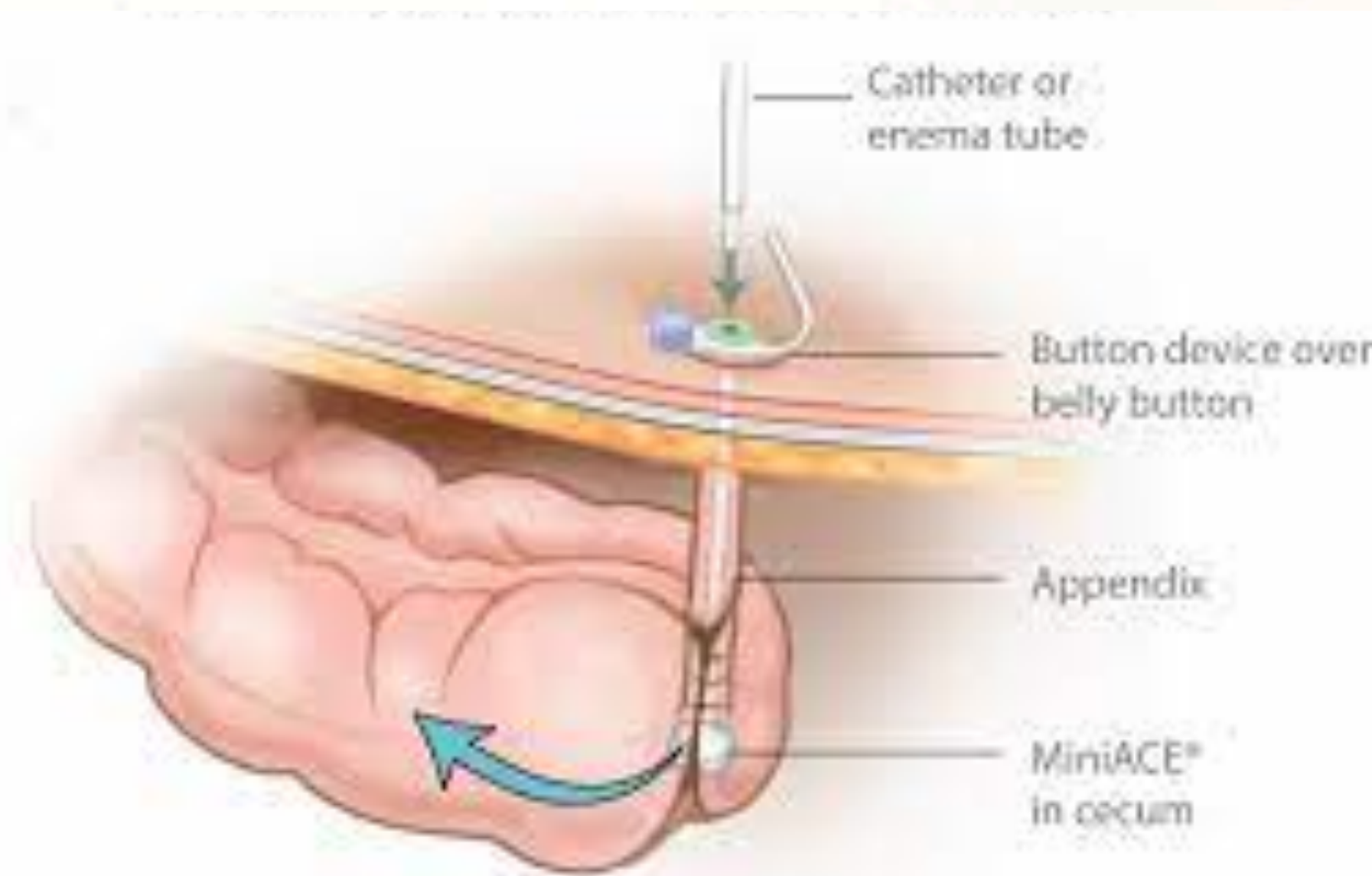
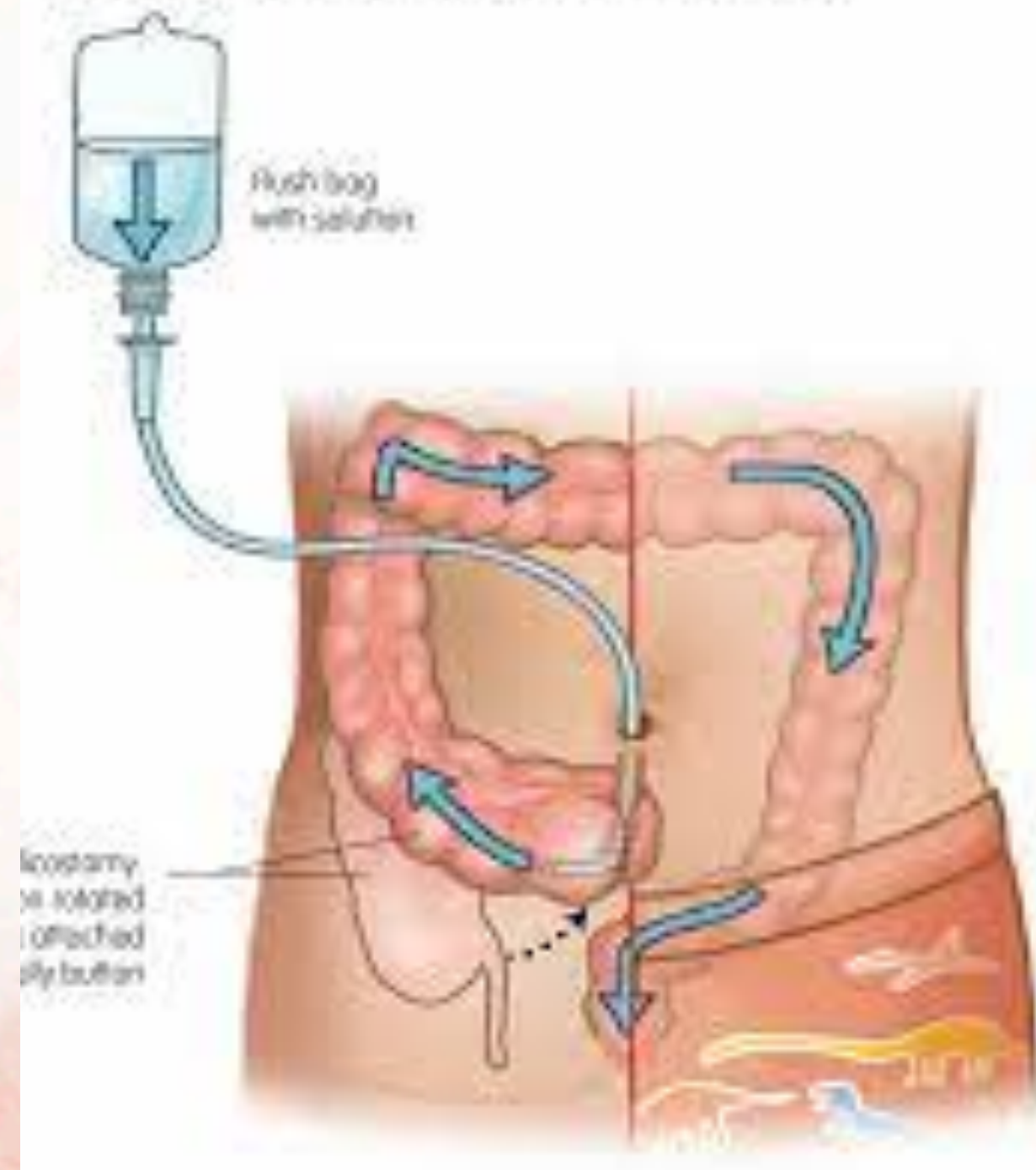




APPENDICOSTOMY
tube cecostomy
tube sigmoidostomies

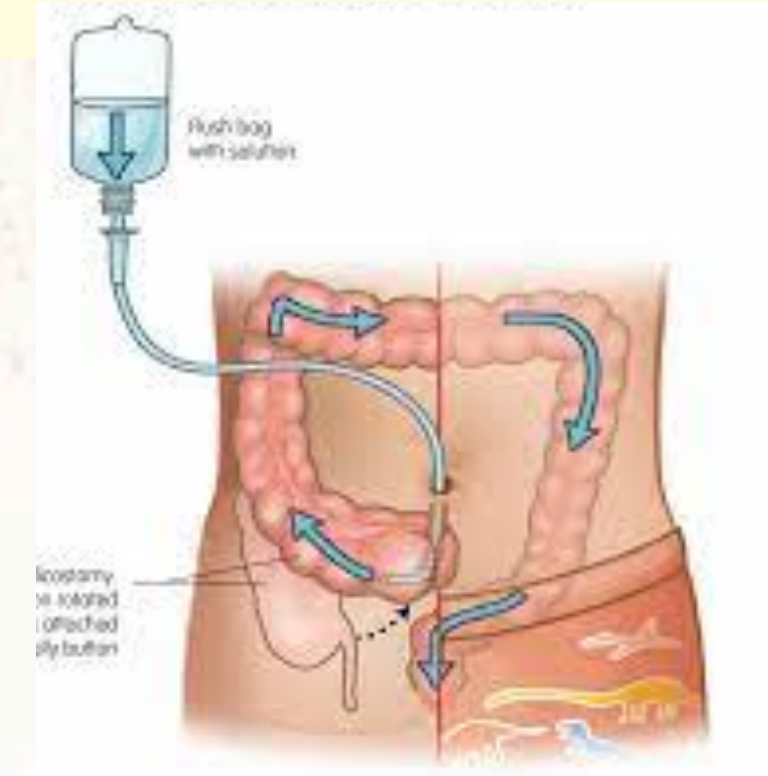
APPENDICOSTOMY, tube cecostomy, tube sigmoidostomies

long-term access sites for **antegrade intestinal irrigation** in children with colonic motility, anal sphincter problems, and myelodysplasia



APPENDICOSTOMY, tube cecostomy, tube sigmoidostomies

- antegrade colonic enema (ACE)
- **depends on the type of colonic pathology**
- If normal peristalsis, right or left colon may be chosen
- **If normal colonic motility, access to left colon by means of a sigmoid irrigation tube.**
- **if dysmotility is a concern, access to the right colon is indicated.**
- If the appendix is present, it is exteriorized with or without interposition of a “valve”
- **If the appendix is no longer available, the wall of the cecum may be fashioned into a conduit**
- Exteriorizing the appendix at the umbilicus has cosmetic advantages.
- **skin-level device in the cecum, especially if there is no appendix**



The background is a soft watercolor illustration. It features delicate pink and orange floral motifs, including what appears to be a branch with leaves in the upper left and some abstract floral shapes in the lower left and bottom center. A prominent yellow banner is centered horizontally, containing the word 'COLOSTOMY' in a bold, orange, sans-serif font.

COLOSTOMY

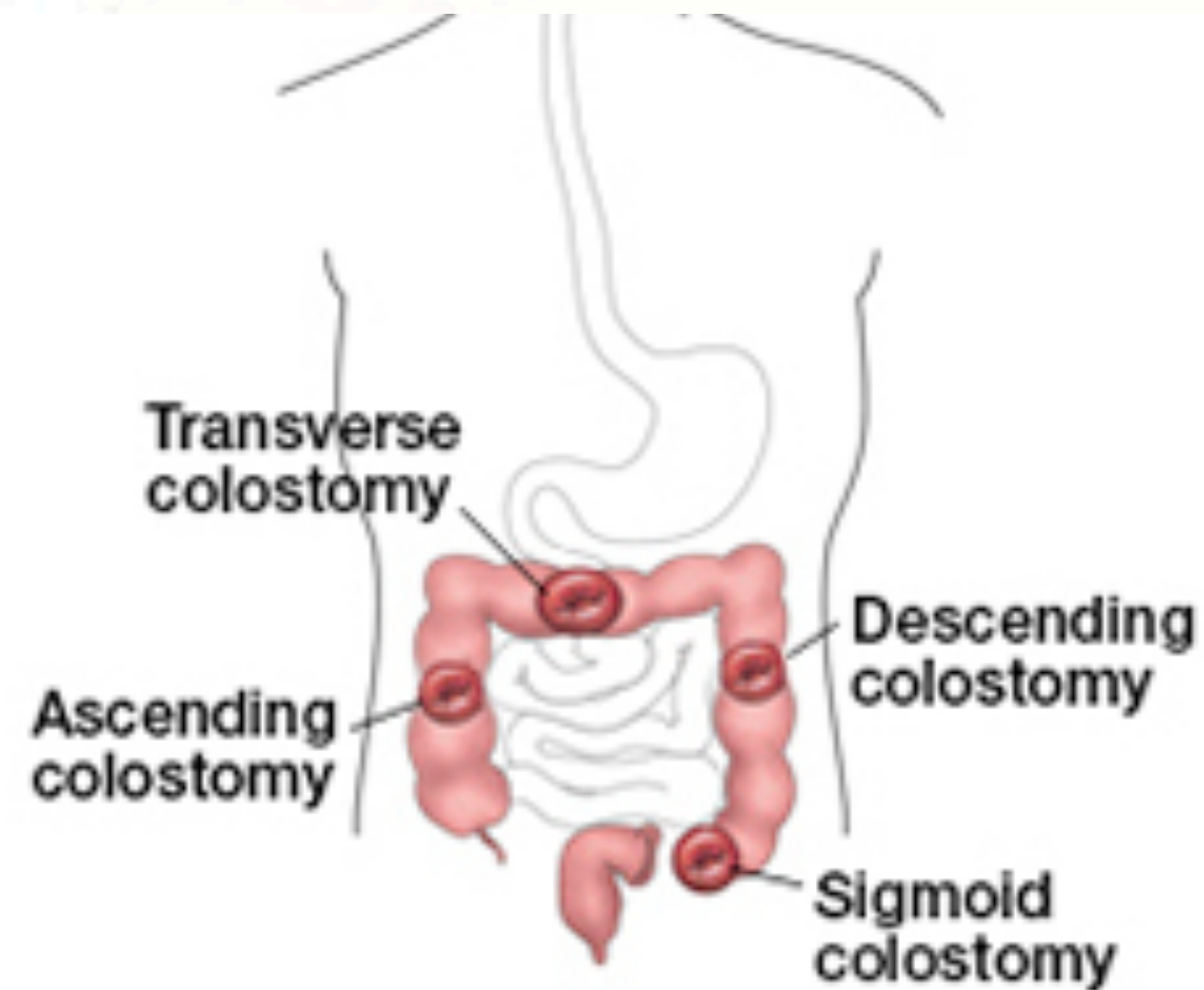
COLOSTOMY

Indication

- Diversion of fecal stream is essential in the treatment of several congenital **hindgut pathologies**
 - high forms of imperforate anus
 - late diagnosis or complicated Hirschsprung disease
 - complex pelvic malformations
 - colonic atresia
 - severe colonic, anorectal or perineal trauma
 - perineal burns
 - complications of malignant
- colostomies are rarely permanent in children

COLOSTOMY

- Most colostomies fall into three categories:
 - right transverse
 - left transverse
 - sigmoid



COLOSTOMY

- For infants with high imperforate anus, the **high (proximal) sigmoid** is the preferred
- Advantage (+)
 - main advantages are **firmer stools**
 - less tendency for skin excoriation
 - less tendency for prolapse
 - less surface for urine absorption, less contamination of the urinary tract in male children with rectovesical fistula.
 - **evacuation of meconium from the often dilated distal portion** of the bowel during the initial procedure.
 - **site** is easily **identified using the pelvic peritoneal reflection as a guide.**
- Disadvantage (-)
 - if low or mid sigmoid is inadvertently exteriorized, there may be
 - **interference with the blood supply,**
 - insufficient bowel length for the future pull-through.
- Although high sigmoid loop colostomy is still used, contemporary preference is for separation of the stomas, particularly in boys



FIGURE 98-8 Five-month-old child with high imperforate anus. The proximal sigmoid loop colostomy is equidistant from the umbilicus, the anterior superior iliac spine, and the inguinal fold. The original incision is only slightly longer than the stoma. Notice the raised "spur" between the two lumina, essential for proper diversion of stool.



FIGURE 98-9 Neonate with high imperforate anus. A divided proximal sigmoid colostomy was placed. The separation of the bowel ends minimizes the incidence of stoma-related problems.⁶⁷ The proximal bowel is slightly everted, and the mucus fistula is flush with the skin. (Courtesy Dr. Mark Levitt.)

COLOSTOMY

transverse colon colostomy

- Advantage (+)
 - **always adequate bowel length for pull-through**
 - **easy to mobilize**
 - smaller diameter
 - no meconium
- Disadvantages (-)
 - sizeable
 - **The stools are looser**
 - skin maceration
 - dehydration are more common
 - greater prolapse rate
 - increased urinary tract problems
 - adequate evacuation of meconium is nearly impossible.

COLOSTOMY

- children with **Hirschsprung disease**
 - requiring a pre-liminary colostomy
 - the best site is the dilated segment that contains normal ganglion cells
 - A **loop colostomy is usually chosen**, although the tendency for prolapse is increased.
 - If **separation of the stomas is chosen, the distal intestine should not be oversewn**
 - most transition zones are in the **sigmoid colon**
 - stoma is taken down at the time of the definitive corrective operation.

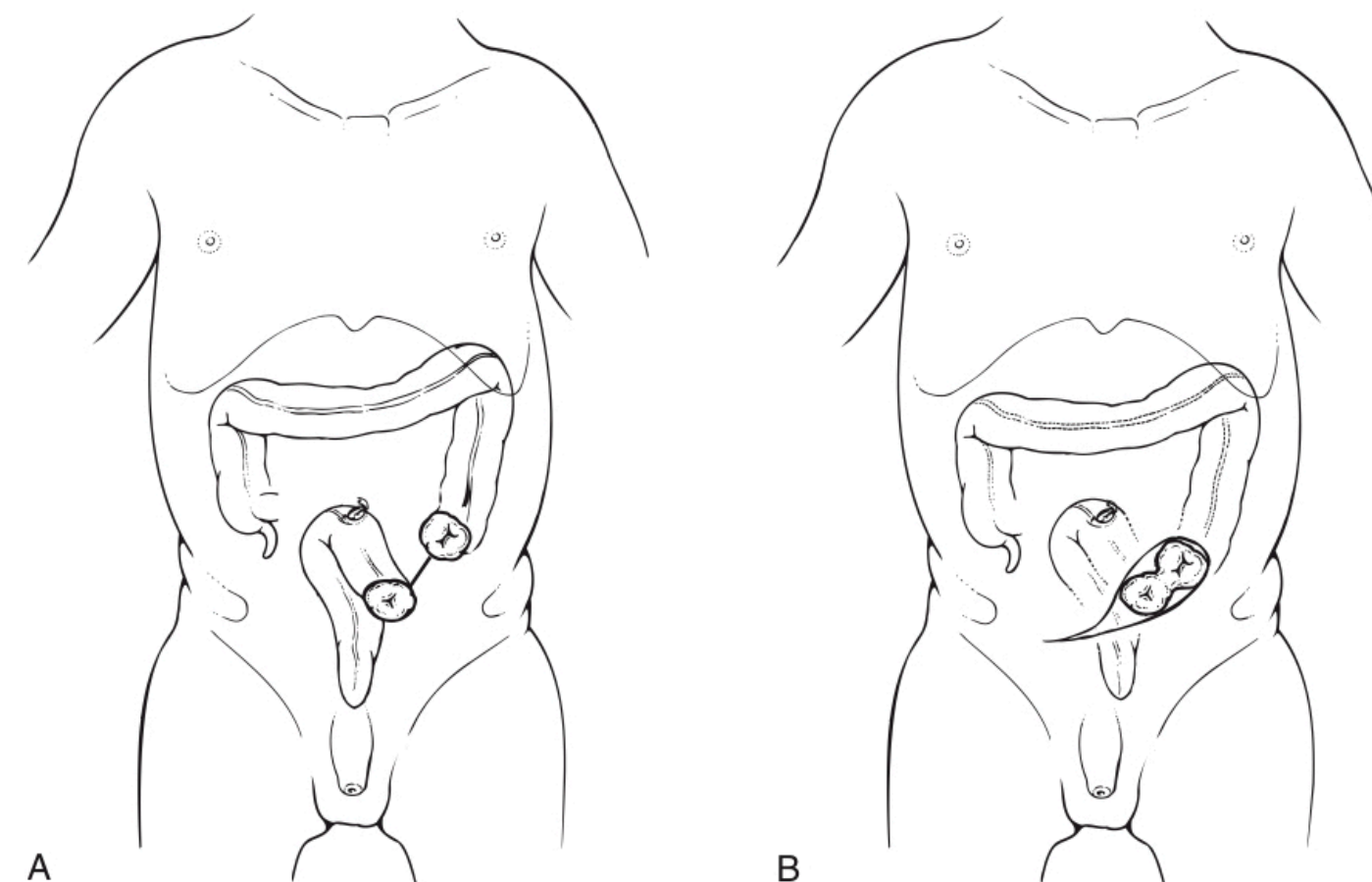


FIGURE 98-5 Sigmoid colostomies. **A**, Separated stomas. The proximal intestine is at the upper end of the incision, and the mucus fistula is at the lower one. **B**, Loop colostomy. The intestine is exteriorized over a rod or skin bridge or with the help of sutures. The circumscribing comma-shaped incision is used for takedown and pull-through procedures.

The background is a soft watercolor illustration. It features a white silhouette of a bird in flight, positioned in the upper right quadrant. The scene is decorated with various leaf-like shapes in shades of pink, red, and orange, scattered across the frame. The overall color palette is warm and pastel, with a light cream or off-white base.

UROSTOMY

UROSTOMIES

Indication

- **ileum or colon** have been **used as conduits of urinary tract pathologies**
- seldom used today.
- mobilized **appendix**, interposed between the bladder and the abdominal wall surface,
 - urinary tract dysfunctions
 - provide a catheterizable conduit to the urinary bladder.



Select Technical Aspects

Select Technical Aspects

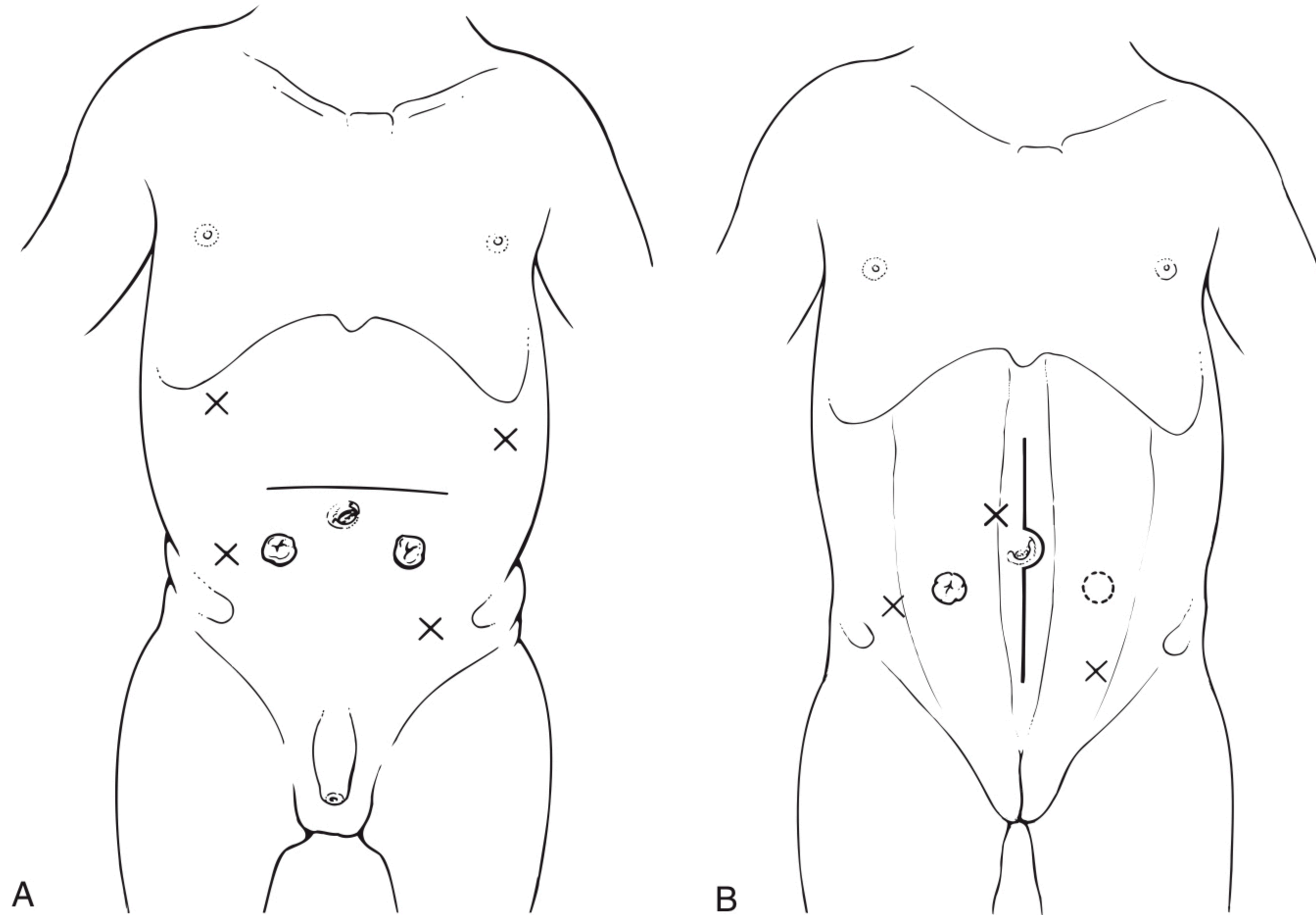
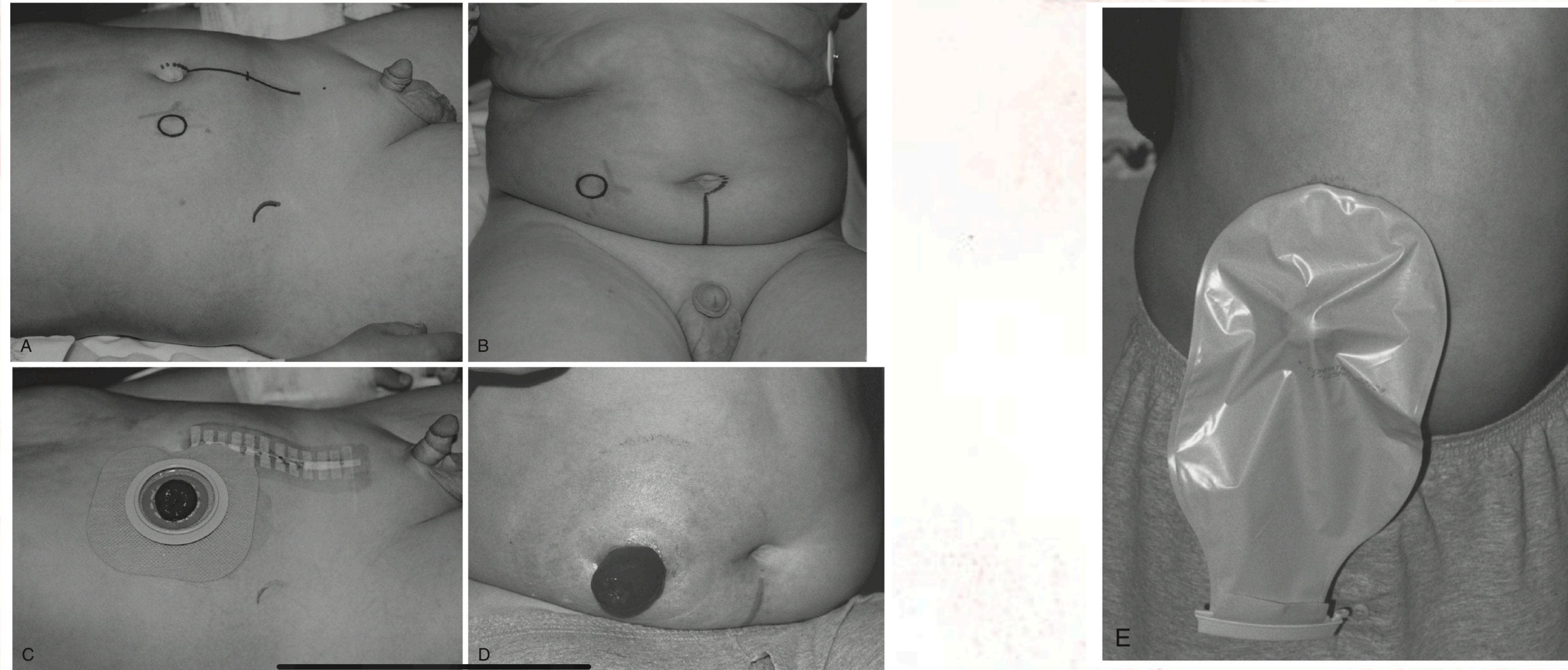


FIGURE 98-11 Ideal sites for stomas. **A**, Infant. The end stoma can be brought out through a counterincision in the lower right or left quadrants. The sites marked with an "X" are unsuitable because they are too close to the rib cage, the anterior superior iliac spine, the flank, or the groin. **B**, Older child or adolescent. The best site for the stoma is in the mid rectus abdominis muscle in the right lower quadrant. The opposite side is an alternative. Areas marked with an "X" are unsuitable. The same sites are used with minimally invasive procedures.

Select Technical Aspects



- Laparotomy incisions in the lower quadrants should be avoided in patients who may eventually have long-standing or permanent stomas because uneven surface interferes with pouch adherence.

Select Technical Aspects

- **site** of the stoma and possible alternatives **should marked on the abdominal wall before any incision is made.**
- both elective and emergency settings.

The exit site

- **over convex midportion of the rectus muscle**
- **away from the incision, umbilicus, bony prominences, and skin folds.**
- overweight children have deep creases of the abdominal wall.

Select Technical Aspects

- **opening** should be wide enough to allow passage of ileum without interfering blood supply.
- **bowel is secured intraperitoneally to avoid torsion and internal hernias** and then **secured with fine absorbable sutures to the rectus sheath.**
- **matured ileostomy must protrude 2 cm or more** (proper pouch fixation)
- Stomas in neonates, particularly for NEC, **should not be matured** because this will interfere with the already tenuous blood supply.

Select Technical Aspects

- exteriorized end of the stoma is simply anchored to the skin with four delicate sutures of a synthetic absorbable material.
- **antibacterial ointment** is applied, and **dressings are avoided**.
- In infants, the mucosa grows rapidly over the exteriorized serosal surface.
- **Deep, full-thickness sutures in the bowel should be avoided because they may cause a fistula** from the lumen to the peristomal tissue, which will interfere with stoma pouch adherence.

Select Technical Aspects

- preferred colostomy , ileostomies is lower left quadrant.
- **The most common site problem**, particularly in newborns, is the **stoma is placed too caudally, close to the inguino-abdominal skin folds.**
- When flexes hips, tend to lift the edges of the stoma appliance, leading to leakage.

Select Technical Aspects

- To avoid excessive narrowing of the stoma, an appropriately sized Hegar dilator or catheter is inserted into the intestinal lumen at the time of wound closure.
- End colostomies should only protrude slightly.
- With a loop stoma
 - - the incision is the length of that loop or only slightly longer.
 - - a temporary catheter is placed through the mesentery of the selected segment which is then lifted above the level of the skin.
- Triangulating sutures approximate the two limbs to each other and to the peritoneum on both sides to prevent internal hernias.
- The full circumference of the intestine is then attached to the peritoneum and fascia.
- Sutures lift the posterior bowel wall above the skin level.
- The intestine is opened longitudinally, and the edges everted.
-

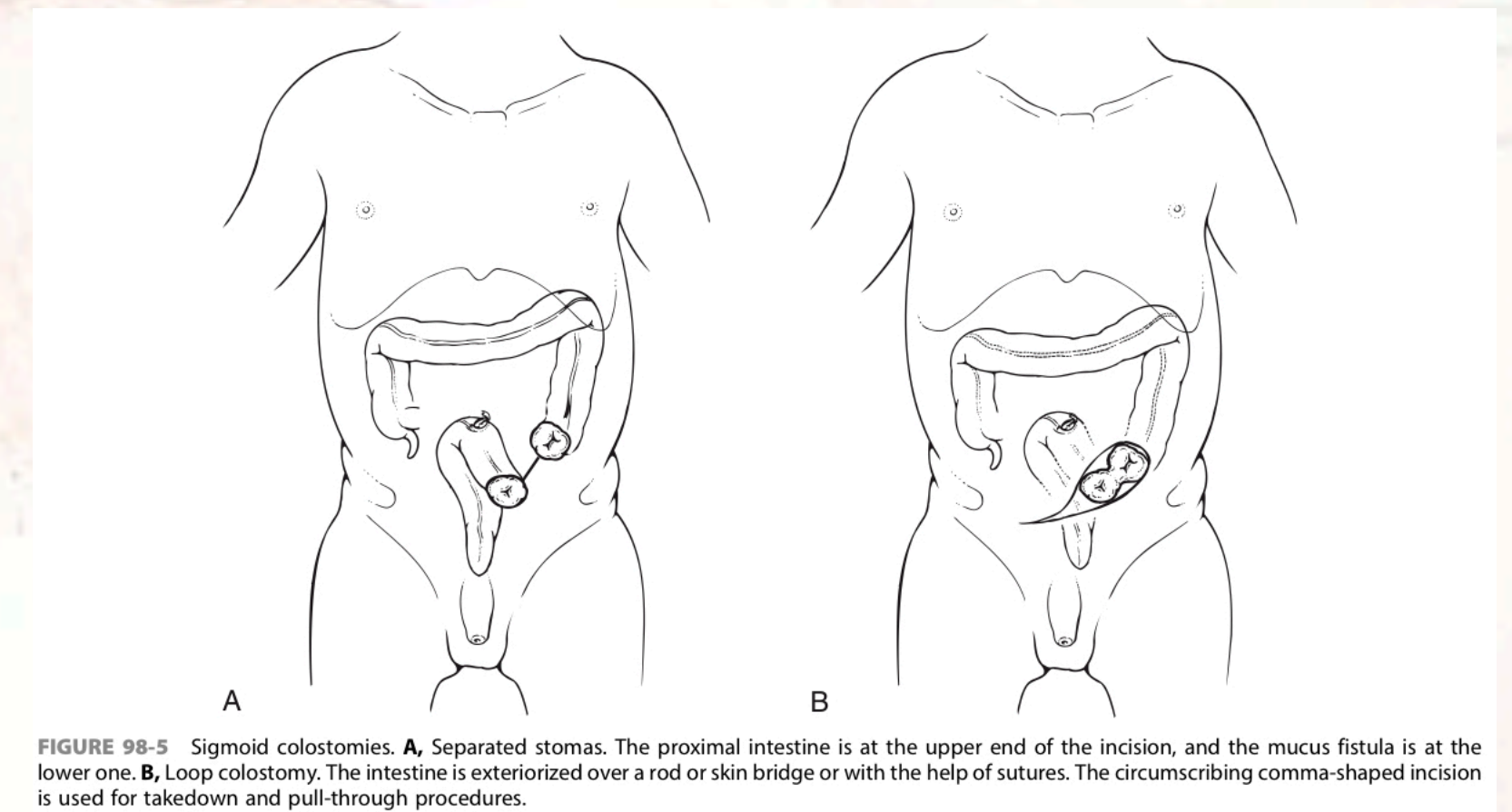


FIGURE 98-8 Five-month-old child with high imperforate anus. The proximal sigmoid loop colostomy is equidistant from the umbilicus, the anterior superior iliac spine, and the inguinal fold. The original incision is only slightly longer than the stoma. Notice the raised "spur" between the two lumina, essential for proper diversion of stool.

Select Technical Aspects

imperforate anus

- the distal, **meconium-filled segment of intestine is evacuated and flushed out** at the time of colostomy placement.
- This is important to **avoid formation of a fecaloma.**

Hirschsprung disease

- construction of the loop stoma must be meticulous
- **tightening of the distended intestine to decrease the prolapse.**
- **Rods or skin flaps placed under the loop are unnecessary** if an appropriate “spur” between the two openings was created.

Select Technical Aspects

To facilitate subsequent takedown

- when exteriorizing **both ends** : **should be kept as close as possible without interfering with the pouch.**
- If the distal limb is placed underneath the abdominal wall: it is **tagged with a nonabsorbable suture or a metallic clip** and placed as close as possible to the exiting stoma to simplify identification at reanastomosis.
- **metallic clip also helps with radiographic identification** of the proximal end of the distal bowel and its **patency when a barium enema is performed before reestablishment of bowel continuity** in children with necrotizing enterocolitis.



Stroma care

Stoma care

- Parents, older children, must be **taught and reassured before leaving** the hospital and on subsequent follow-up visits.

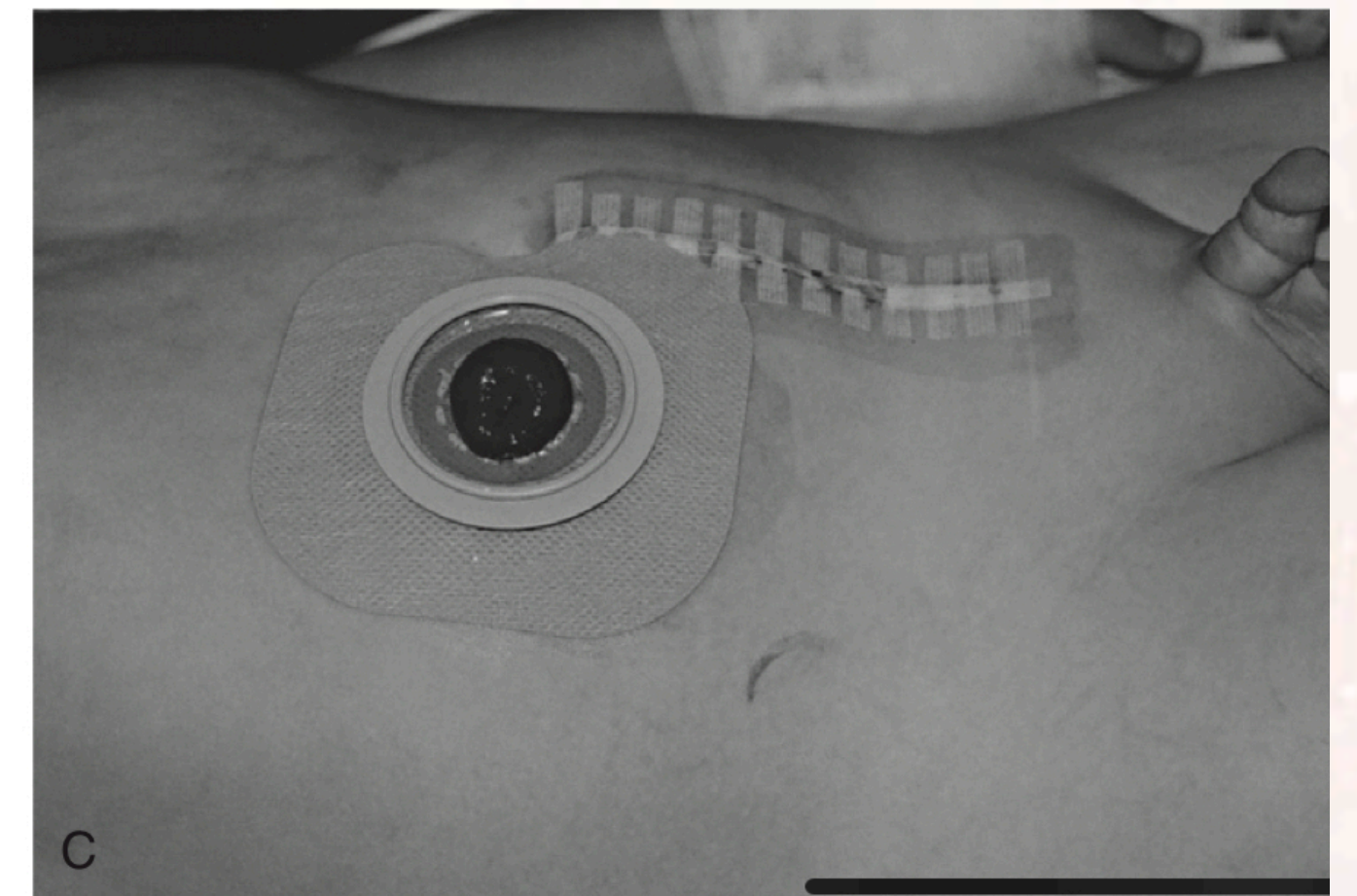
stoma appliances

- disposable and reusable **pouches** for all ages and sizes, even the smallest premature infants.
- Skin barriers
- adhesives
- powders
- odor control solutions



Stoma care

- appliances should remain in situ for 3 days is a reasonable expectation.
- Two basic types of pediatric appliances:
 - one-piece pouching system
 - two-piece system
- The skin barrier is cut to the proper stoma size



Stoma care

Candidiasis

- common problem in the parastomal skin
- local antifungal medication should be used at the earliest sign of irritation.



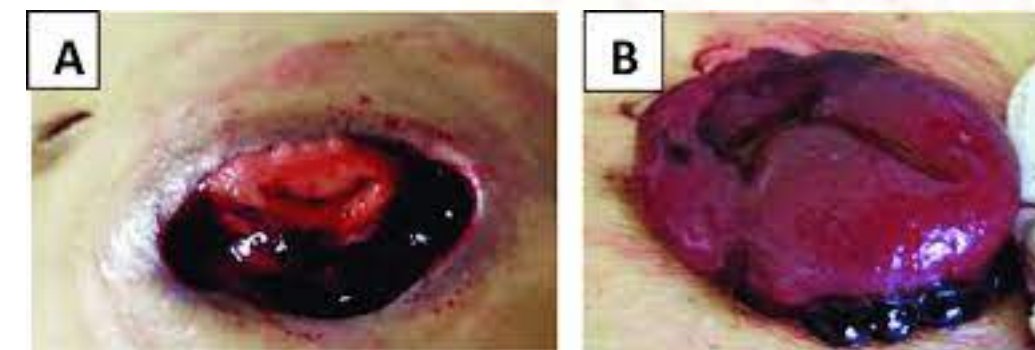
skin excoriation

- skin expose to air
- synthetic barrier is applied.
- A hair dryer can be useful.



Mild stomal bleeding

- usually self-limiting.
- Excision and/or application of silver nitrate may be necessary to control granulation tissue around the mucosa-skin interface in the early stages.



Stoma care

- **Remaining sutures** should be removed.
- **Routine dilatation** of stomas is **not recommended**.
- **Malfunctioning stomas often require early takedown or revision** before more serious complications occur.
- **Occasional irrigation** of the distal intestine can be useful and help eliminate malodorous mucus plugs.
- **Dietary and select pharmacologic** manipulations are helpful in producing firmer stools.
- Children with **high ileostomies must be carefully monitored to prevent electrolyte imbalance and insufficient nutrient absorption.**



Reestablishing Intestinal Continuity

Reestablishing Intestinal Continuity

Timing of closure

- depending on the underlying condition, health status
- presence / absence of stoma-related complications.
- The more proximal the stoma, the earlier it should be closed to **decrease metabolic complications.**

- Children who **previously underwent resection because of ischemic intestine must have a preoperative contrast study of the distal segment to rule out strictures or complete luminal obstruction.**

- Reestablishment of **small bowel** continuity does **not require intestinal preparation.**

Reestablishing Intestinal Continuity

Takedown of a colostomy

- **preceded by antegrade intestinal irrigation**, supplemented by conventional enemas.
- **perioperative IV ATB** are routinely administered
- Good exposure with full mobilization of the intestinal ends is important.
- Although extraperitoneal closure has been used in children, it is not recommended for routine use.

Reestablishing Intestinal Continuity

Intestinal anastomoses

- a single-layer technique
- fine interrupted sutures
- absorbable suture material

- Primary wound closure is generally safe

- Early post-operative feeding after colostomy closure is encouraged.



Complications of Enterostomas

Complications of Enterostomas

- Complication rates that often reach and sometimes exceed 50%
- Complications of enterostomas used for feeding are often accentuated by the patient's underlying disease, particularly in malnourished, neurologically impaired children.
- Stomas used for evacuation of the small intestine have higher morbidity than colostomies (fluid, electrolyte, and absorption losses.)
- Transverse colostomies are more prone to complications than are sigmoid stomas
- in several series, **divided colostomies have been preferred over loop colostomies**

Complications of Enterostomas

TABLE 98-3

Common Complications of Enterostomas

Prolapse
Stricture
Retraction
Wound separation, dehiscence
Wound infection, postoperative sepsis
Parastomal hernia
Intestinal wall separation or perforation with catheter change
Exteriorization of wrong intestinal segment or end
Intestinal obstruction (adhesion, internal hernia)
Intestinal torsion with ischemia
Fistula formation
Perforation by feeding or irrigating catheter
Poor appliance fitting and leakage
Psychological trauma
Skin excoriation, candidiasis, dermatitis
Mucosal excoriation and bleeding
Granulation tissue of mucosa-skin interface
Variceal bleeding with portal hypertension
Electrolyte imbalance
Acidosis (caused by urine absorption in the distal loop of intestine)
Fecal impaction (in the distal loop of intestine)

Complications of Enterostomas

Prolapse

- The incidence $> 20\%$
- more common if the distal loop is exteriorized.



Complications of Enterostomas

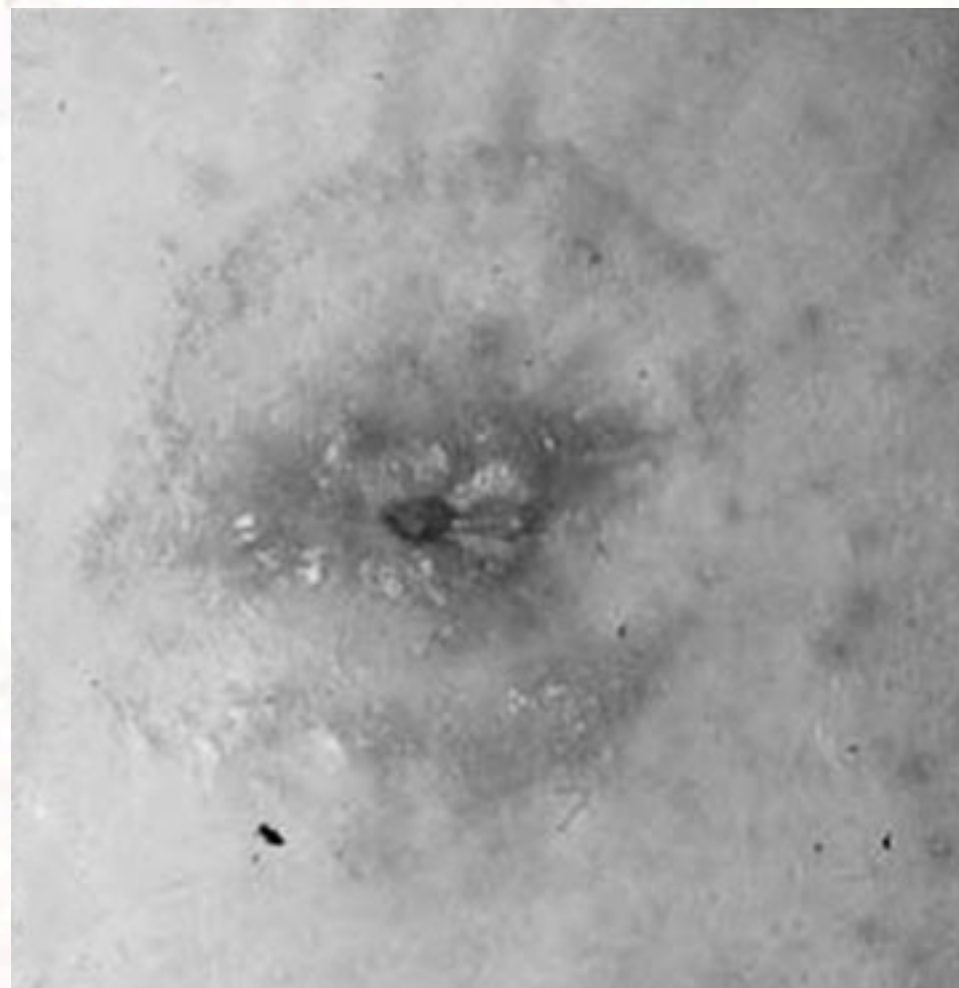
- Minor prolapse : **still functional**.
 - apply of table sugar
 - ionized salt crystals
 - hyaluronidase
 - hypertonic saline injections effectively diminish bowel edema osmotically.
- Major prolapse : **cyanotic**, dusky, may totally occlude the stomal orifice.
 - **requires prompt attention**, for intestinal reduction.
 - **external devices**
 - **modified purse-string** suture techniques
 - placement of **U-shaped stitches from the lumen** of the reduced intestine through the abdominal wall over pledget ,prevent the suture from cutting through.



Complications of Enterostomas

Stricture

- mild, may respond to dilatation.
- **if proximal intestine begins to dilate, revision is advisable.**
 - **incising all layers** around the strictured stoma and **bringing out healthy bowel.**
 - If more complex / parastomal hernia is present
Use a counterincision or laparoscopic repair.



Complications of Enterostomas

Retraction

- may lead to skin-level stricture and obstruction
- retraction of a loop stoma
 - interferes with proper evacuation
 - filling of the distal intestinal loop with stool.



Complications of Enterostomas

Stomal bleeding

- rare
 - serious in children on long-term parenteral nutrition with liver dysfunction leading to portal hypertension. **The varices developing between the portal and systemic circulations at the level of the stoma are vulnerable**
 - may result in drops in hemoglobin levels.
-
- correction of a coagulopathy,
 - direct pressure
 - suture ligation
 - application of hemostatic substances.
 - Tranexamic acid, antifibrinolytic amino acid, has been reported to stabilize formed clots and reduce rebleeding.

Complications of Enterostomas

Intestinal obstruction

- from adhesions or internal hernias
- occur at any time, even in the immediate postoperative period.

Complications of Enterostomas

Intestinal reanastomosis

- high rate of complications,
 - mostly wound infection
 - dehiscence
 - fistula formation
 - intestinal obstruction.
- **factors** contributing to morbidity, **should be corrected before** reestablishment of intestinal continuity is contemplated.
 - poor timing
 - inadequate bowel preparation
 - technical errors
 - improper choice of suture material
 - excessive use of the electrocautery
 - Malnourished, anemia
 - on corticosteroids are at greatest risk for complications.



Q & A