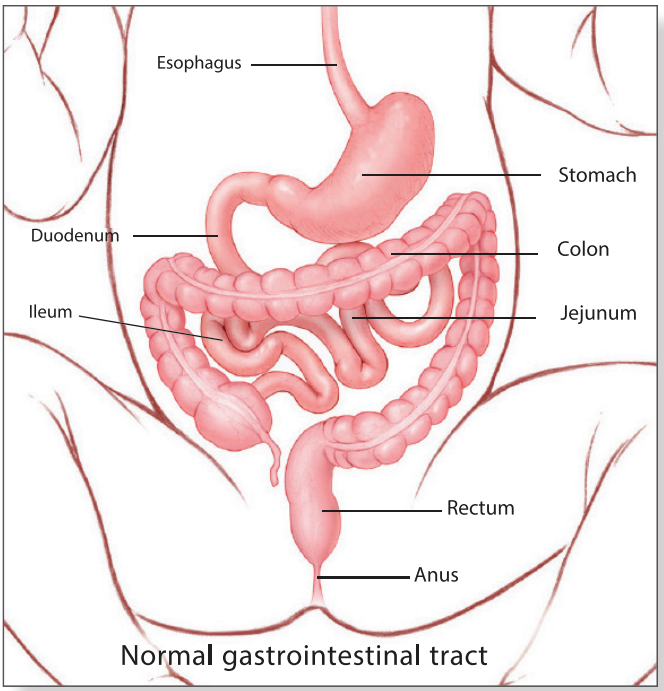
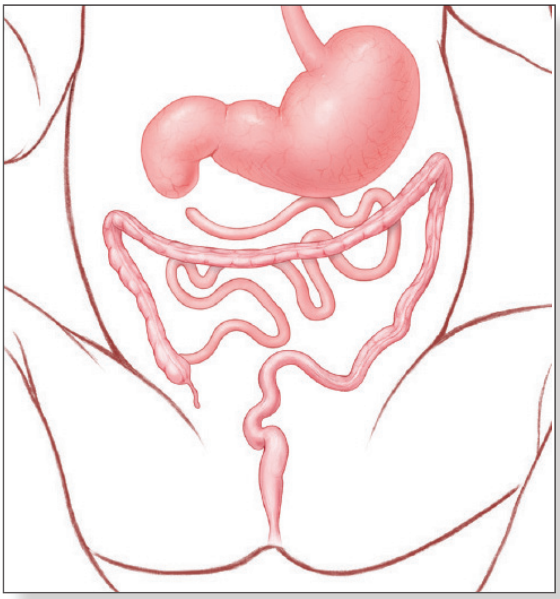
Appendix 1.1 Bowel Obstruction

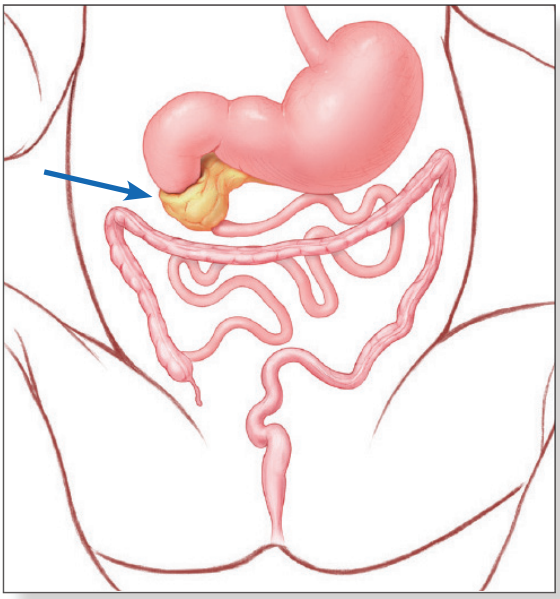
Causes of bowel obstruction include stenosis (narrowing of the lumen) or atresia (complete obstruction) anywhere in the intestinal tract: esophageal, duodenal, jejunal, ileal, anal, or incarcerated hernia. As shown in Figure 1.2 on page 8, volvulus of the bowel will also cause obstruction and if not treated emergently, may result in total bowel necrosis. Functional causes of bowel obstruction include Hirschsprung's disease (absent ganglion cells in a section of the colon which interferes with normal peristaltic movement of stool), meconium plug syndrome, septic ileus, meconium ileus, and hypothyroidism. Acquired causes of bowel obstruction include necrotizing enterocolitis (an intestinal infection that primary affects preterm infants) and peritoneal adhesions that may develop following intestinal infection or surgery. Adhesions can also be congenital; they are usually called "bands".



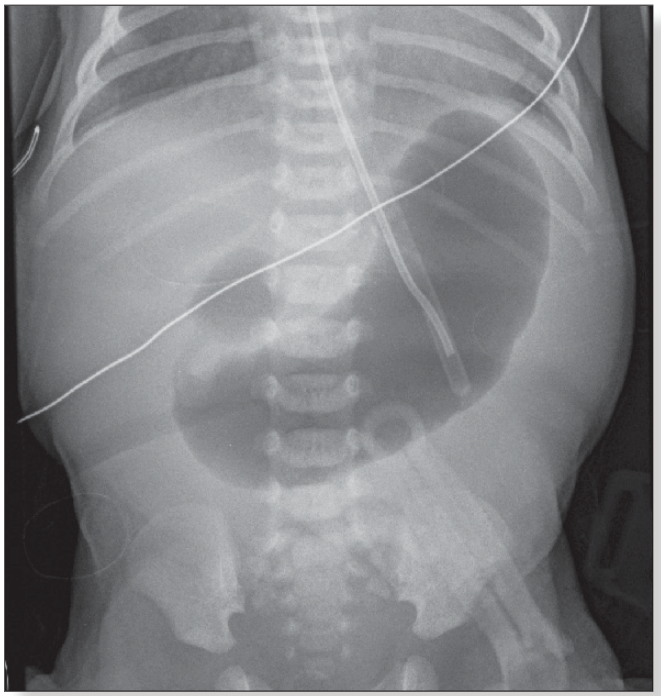
Normal gastrointestinal tract



Duodenal atresia: complete atresia.



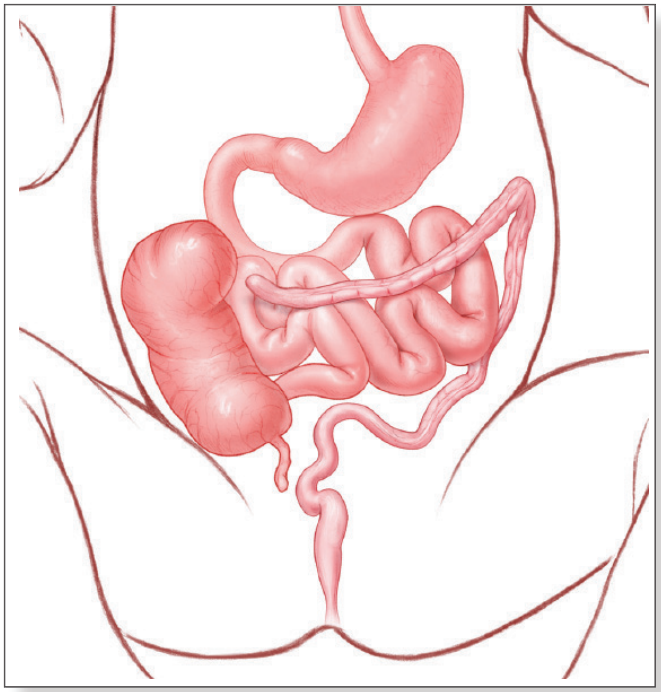
The duodenum may be partially or completely obstructed secondary to an annular pancreas (blue arrow).



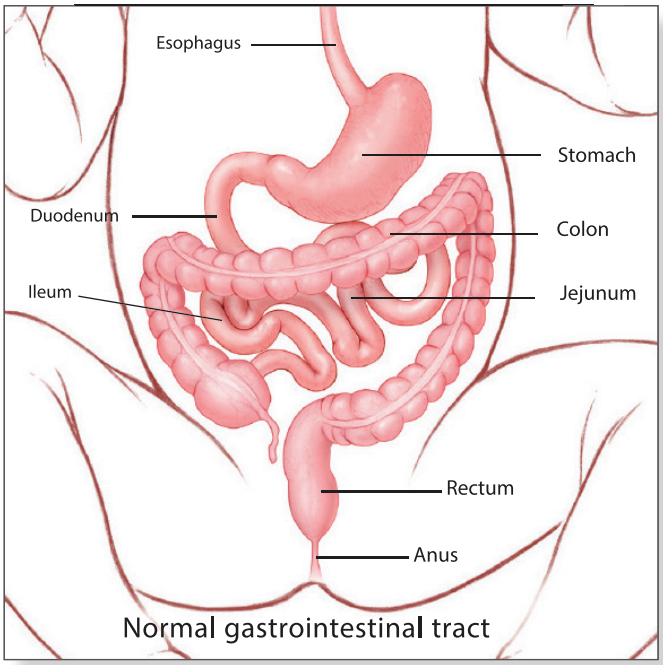
36 week gestation infant with Trisomy 21 (Down syndrome) with duodenal atresia. Note the following: distended gas filled stomach, gas in the pyloric channel and mildly distended gas filling the duodenal bulb. No bowel gas is present in the remainder of the bowel. The "double-bubble" sign represents the dilated stomach and obstructed portion of the duodenum.

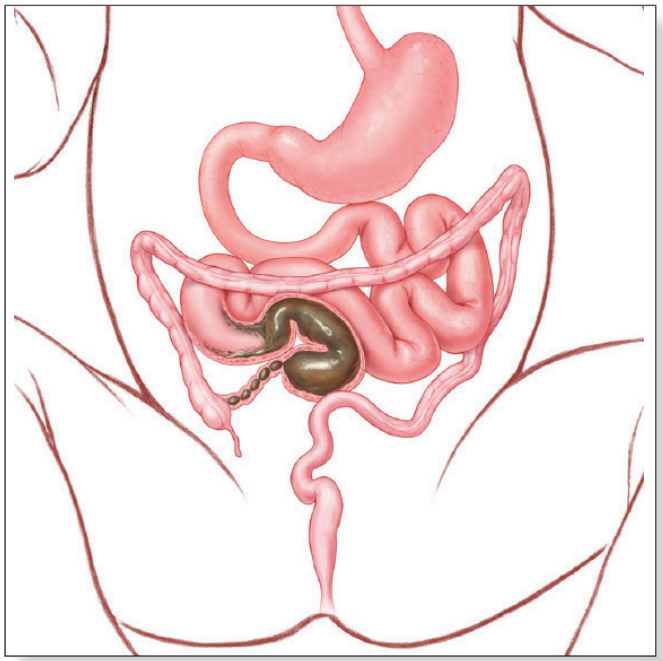
Appendix 1.1 Bowel Obstruction (continued)

Jejunoileal atresia . Atresia may be in the ileum, jejunum or both. There are various forms of jejunoileal atresia. One of the more common, (type IIIa) is illustrated here. Notice the two ends of atretic bowel are separated by a "V" shaped defect in the mesentery. The small bowel is dilated with gas prior to the area of atresia.



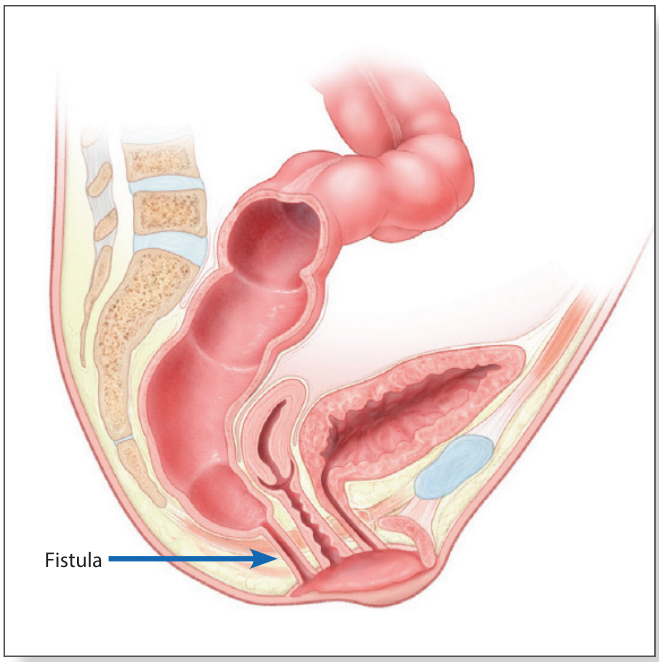
Colonic atresia. Notice the dilated small intestine and colon, up to the area of atresia in the colon.





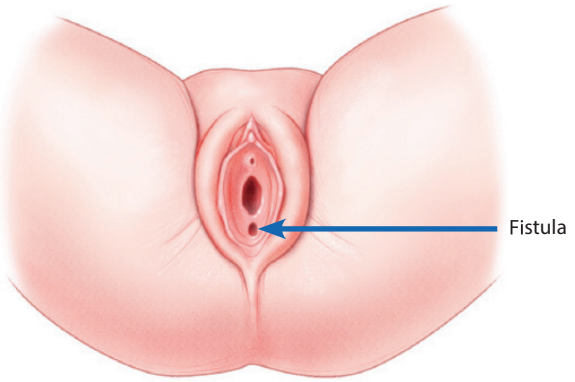
Meconium ileus . Inspissated meconium obstructs the terminal ileum just prior to the ileocecal valve. Notice the pellets of hard meconium that prevent any gas or stool to pass. The problem results, in the majority of cases because of a lack of pancreatic enzymes that are necessary to digest intestinal contents, therefore, these infants must be evaluated for cystic fibrosis. If an abdominal x-ray reveals calcifications, this means the infant experienced intestinal perforation in utero.

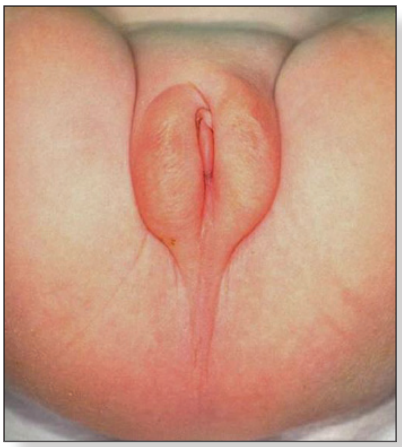
Appendix 1.1 Bowel Obstruction (continued)



Imperforate anus with rectovestibular fistula in a female infant. Illustration demonstrates a rectovestibular fistula which is a connection between the rectum and the entroitus external to the hymen and not on the perianal skin.

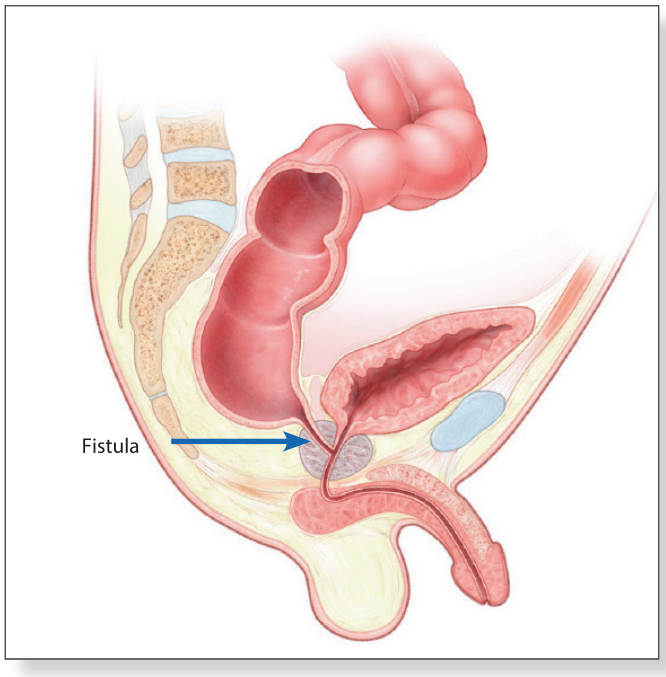
Meconium from a fistula external to the hymen but not on the perineal skin indicates rectovestibular fistula . This is the most common type of imperforate anus in females.



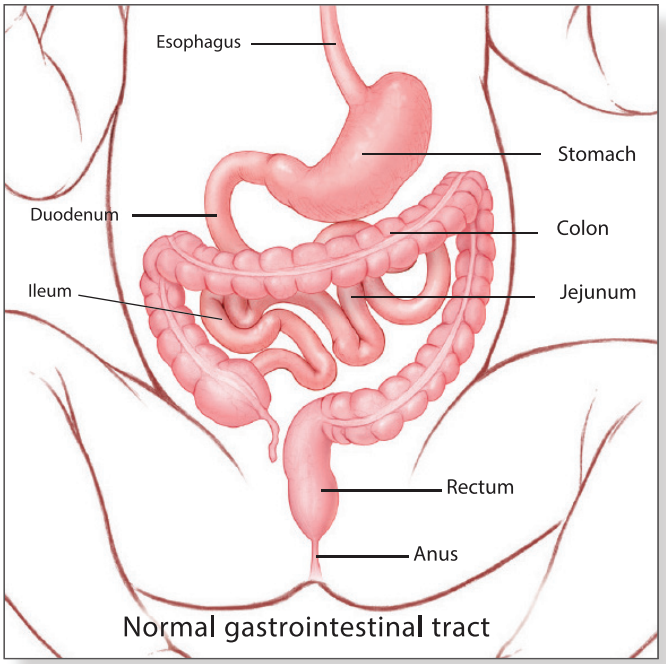


Female with imperforate anus. Since there is no evidence of fistula apparent at this time (no meconium is seen exiting the hymen), the differential diagnosis would include rectovestibular fistula and cloaca. Rectovestibular fistula is when there is a connection between the rectum and the entroitus external to the hymen and not on the perineal skin. A cloaca is when the urinary tract, vagina and rectum all meet in a common channel and the rectal fistula is proximal to the hymen. With both of these variants, meconium might be seen draining from the vagina.

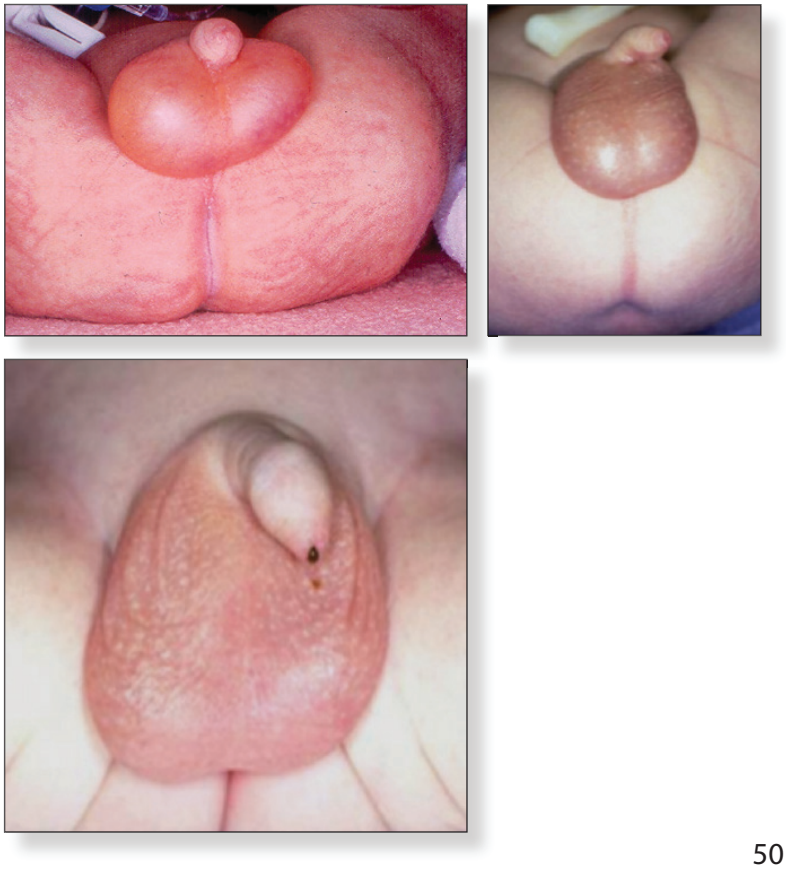
Appendix 1.1 Bowel Obstruction (continued)



Imperforate anus in a male infant. Notice there is a rectoprostatic fistula between the distal bowel and the urethra (blue arrow).

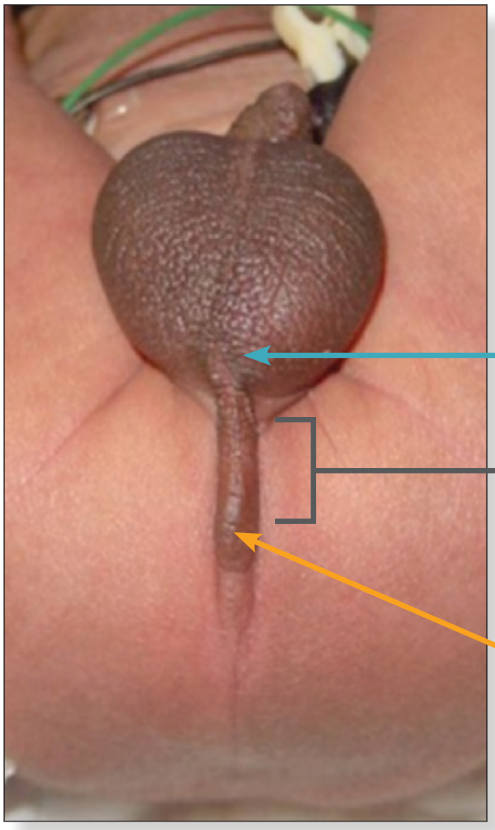


Photos of two male infants with high imperforate anus. The most common lesion in a male that would require diversion is the rectoprostatic fistula. Signs of this and more proximal lesions would include the absence of any meconium in the perineum (photo on left), a flat bottom and abnormal sacrum (photo on right), and meconium in the urine or at the tip of the penis (bottom photo). The flat bottom, especially if the sacrum is abnormal is virtually diagnostic of a proximally located rectum which would require diversion.



Appendix 1.1 Bowel Obstruction (continued)

Infant with abdominal distension (gas filled bowel loops) secondary to imperforate anus. Notice the green colored (bilious) drainage in the orogastric tube.



The thickened tissue in the midline raphe is usually associated with the presence of a one type of rectoperineal fistula, or low lesion in which repair at birth with an anoplasty could be done. Sometimes a series of white beads can be seen through a thin epidermis or even meconium itself may be seen. The location of the actual fistula into the rectum is usually very close to the normal anal site in these patients (see orange arrow).