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Anatomy

Ana 206

Discuss on the rotation of intestine

## **What Is Intestinal Malrotation and Volvulus?**

During normal abdominal development, the 3 divisions of the GI tract (ie, foregut, midgut, hindgut) herniate out from the abdominal cavity, where they then undergo a 270º counter clockwise rotation around the superior mesenteric vessels. Following this rotation, the bowels return to the abdominal cavity, with fixation of the duodenojejunal loop to the left of the midline and the cecum in the right lower quadrant.

Intestinal malrotation, also called twisted intestines, occurs when the [intestine](https://www.chp.edu/our-services/transplant/intestine/education/intestine-disease-states) does not twist correctly. Instead, the way in which it twists blocks the intestine. Sometimes, abnormal tissue referred to as Ladd's bands attaches the cecum to the duodenum (beginning of the small intestine) and may create a blockage in the duodenum.

Our intestines are formed while we are foetuses in the womb, during the tenth week of gestation. As the intestines develop, they normally move from the base of the umbilical cord back into the abdominal cavity. As the intestine returns to the abdomen, it makes two rotations and settles into its normal position.

Some kids with malrotation never have problems and the condition isn't diagnosed. But most develop symptoms and are diagnosed by 1 year of age. Although surgery is needed to repair malrotation, most kids will go on to grow and develop normally after treatment.

### **How Does Intestinal Malrotation Happen?**

The intestines are the longest part of the [digestive system](https://kidshealth.org/en/parents/digestive.html). If stretched out to their full length, they would measure more than 20 feet long by adulthood, but because they're folded up, they fit into the relatively small space inside the abdomen.

When a foetus develops in the womb, the intestines start out as a small, straight tube between the stomach and the rectum. As this tube develops into separate organs, the intestines move into the umbilical cord, which supplies nutrients to the developing embryo.

Near the end of the first trimester of pregnancy, the intestines move from the umbilical cord into the abdomen. If they don't properly turn after moving into the abdomen, malrotation occurs. It happens in 1 out of every 500 births in the United States and the exact cause is unknown.

Some children with intestinal malrotation are born with other associated conditions, including:

* other defects of the digestive system
* heart defects
* abnormalities of other organs, including the spleen or liver

### What Problems Can It Cause?

Malrotation can lead to these complications:

* In a condition called **volvulus**, the bowel twists on itself, cutting off the blood flow to the tissue and causing the tissue to die. Symptoms of volvulus, including pain and cramping, are often what lead to the diagnosis of malrotation.
* Bands of tissue called **Ladd's bands** may form, obstructing the first part of the small intestine (the duodenum).
* Obstruction caused by volvulus or Ladd's bands is a potentially life-threatening problem. The bowel can stop working and intestinal tissue can die from lack of blood supply if an obstruction isn't recognized and treated. Volvulus, especially, is a medical emergency, with the entire small intestine in jeopardy.

### **What Are the Signs of Intestinal Malrotation?**

An intestinal blockage can prevent the proper passage of food. So one of the earliest signs of malrotation and volvulus is abdominal pain and cramping, which happen when the bowel can't push food past the blockage.

A baby with cramping might:

* pull up the legs and cry
* stop crying suddenly
* behave normally for 15 to 30 minutes
* repeat this behaviour when the next cramp happens

Infants also may be fussy, lethargic, or have trouble pooping.

Vomiting is another symptom of malrotation, and it can help the doctor determine where the obstruction is. Vomiting that happens soon after the baby starts to cry often means the blockage is in the small intestine; delayed vomiting usually means it's in the large intestine. The vomit may contain bile (which is yellow or green) or may resemble feces.

Other symptoms of malrotation and volvulus can include:

* a swollen abdomen that's tender to the touch
* diarrhoea and/or bloody poop (or sometimes no poop at all)
* fussiness or crying in pain, with nothing seeming to help
* rapid heart rate and breathing
* little or no pee because of fluid loss
* fever

### **How Is a Blockage Diagnosed?**

If volvulus or another intestinal blockage is suspected, the doctor will examine your child and then may order [X-rays](https://kidshealth.org/en/parents/xray-abdomen.html), a computed tomography [(CT) scan](https://kidshealth.org/en/parents/cat-scan-abdomen.html), or an [abdominal ultrasound.](https://kidshealth.org/en/parents/ultrasound-abdomen.html)

The doctor may use **barium** or another liquid contrast agent to see the X-ray or scan more clearly. The contrast can show if the bowel has a malformation and can usually find where the blockage is.

Adults and older kids usually drink barium in a liquid form. Infants may need to be given barium through a tube inserted from the nose into the stomach, or sometimes are given a barium enema, in which the liquid barium is inserted through the rectum.

### **How Is Intestinal Malrotation Treated?**

Treating significant malrotation almost always requires surgery. The timing and urgency will depend on the child's condition. If there is already a volvulus, surgery must be done right away to prevent damage to the bowel.

Any child with bowel obstruction will need to be hospitalized. A tube called a **nasogastric** **(NG)** tube is usually inserted through the nose and down into the stomach to remove the contents of the stomach and upper intestines. This keeps fluid and gas from building up in the abdomen. The child may also be given intravenous (IV) fluids to help prevent dehydration and antibiotics to prevent infection.

During the surgery, which is called a **Ladd procedure**, the intestine is straightened out, the Ladd's bands are divided, the small intestine is folded into the right side of the abdomen, and the colon is placed on the left side.

Because the appendix is usually found on the left side of the abdomen when there is malrotation (normally, the appendix is found on the right), it is removed. Otherwise, should the child ever develop [appendicitis](https://kidshealth.org/en/parents/appendicitis.html), it could complicate diagnosis and treatment.

If it appears that blood may still not be flowing properly to the intestines, the doctor may do a second surgery within 48 hours of the first. If the bowel still looks unhealthy at this time, the damaged portion might be removed.