

# Short Bowel Syndrome

*National Digestive Diseases Information Clearinghouse*



National Institute of  
Diabetes and Digestive  
and Kidney Diseases

## What is Short Bowel Syndrome

Short bowel syndrome is a group of problems related to poor absorption of nutrients. Short bowel syndrome typically occurs in people who have

- had at least half of their small intestine removed and sometimes all or part of their large intestine removed
- significant damage of the small intestine
- poor motility, or movement, inside the intestines

Short bowel syndrome may be mild, moderate, or severe, depending on how well the small intestine is working.

People with short bowel syndrome cannot absorb enough water, vitamins, minerals, protein, fat, calories, and other nutrients from food. What nutrients the small intestine has trouble absorbing depends on which section of the small intestine has been damaged or removed.

## What is the small intestine?

The small intestine is the tube-shaped organ between the stomach and large intestine. Most food digestion and nutrient absorption take place in the small intestine. The small intestine is about 20 feet long and includes the duodenum, jejunum, and ileum:

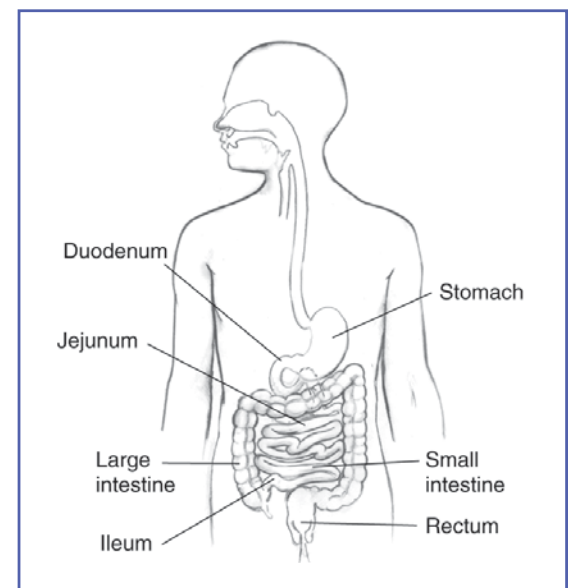
duodenum—the first part of the small intestine, where iron and other minerals are absorbed

jejunum—the middle section of the small intestine, where carbohydrates, proteins, fat, and most vitamins are absorbed

ileum—the lower end of the small intestine, where bile acids and vitamin B12 are absorbed

## What is the large intestine?

The large intestine is about 5 feet long in adults and absorbs water and any remaining nutrients from partially digested food passed from the small intestine. The large intestine then changes waste from liquid to a solid matter called stool.



The small intestine is the tube-shaped organ between the stomach and large intestine.

## What causes Short Bowel Syndrome?

The main cause of short bowel syndrome is surgery to remove a portion of the small intestine. This surgery can treat intestinal diseases, injuries, or birth defects.

Some children are born with an abnormally short small intestine or with part of their bowel missing, which can cause short bowel syndrome. In infants, short bowel syndrome most commonly occurs following surgery to treat necrotizing enterocolitis, a condition in which part of the tissue in the intestines is destroyed.<sup>1</sup>

Short bowel syndrome may also occur following surgery to treat conditions such as

- cancer and damage to the intestines caused by cancer treatment
- Crohn's disease, a disorder that causes inflammation, or swelling, and irritation of any part of the digestive tract
- gastroschisis, which occurs when the intestines stick out of the body through one side of the umbilical cord
- internal hernia, which occurs when the small intestine is displaced into pockets in the abdominal lining
- intestinal atresia, which occurs when a part of the intestines doesn't form completely
- intestinal injury from loss of blood flow due to a blocked blood vessel
- intestinal injury from trauma
- intussusception, in which one section of either the large or small intestine folds into itself, much like a collapsible telescope

- meconium ileus, which occurs when the meconium, a newborn's first stool, is thicker and stickier than normal and blocks the ileum
- midgut volvulus, which occurs when blood supply to the middle of the small intestine is completely cut off
- omphalocele, which occurs when the intestines, liver, or other organs stick out through the navel, or belly button

Even if a person does not have surgery, disease or injury can damage the small intestine.

## How common is Short Bowel Syndrome?

Short bowel syndrome is a rare condition. Each year, short bowel syndrome affects about three out of every million people.<sup>1</sup>

## What are the signs and symptoms of Short Bowel Syndrome?

The main symptom of short bowel syndrome is diarrhea—loose, watery stools. Diarrhea can lead to dehydration, malnutrition, and weight loss. Dehydration means the body lacks enough fluid and electrolytes—chemicals in salts, including sodium, potassium, and chloride—to work properly. Malnutrition is a condition that develops when the body does not get the right amount of vitamins, minerals, and nutrients it needs to maintain healthy tissues and organ function. Loose stools contain more fluid and electrolytes than solid stools. These problems can be severe and can be life threatening without proper treatment.

---

<sup>1</sup>Thompson JS, Rochling FA, Weseman RA, Mercer DF. Current management of short bowel syndrome. *Current Problems in Surgery*. 2012;49(2):52–115.

## Seek Help for Signs or Symptoms of Severe Dehydration

People who have any signs or symptoms of severe dehydration should call or see a health care provider right away:

- excessive thirst
- dark-colored urine
- infrequent urination
- lethargy, dizziness, or faintness
- dry skin

Infants and children are most likely to become dehydrated. Parents or caretakers should watch for the following signs and symptoms of dehydration:

- dry mouth and tongue
- lack of tears when crying
- infants with no wet diapers for 3 hours or more
- infants with a sunken soft spot
- unusually cranky or drowsy behavior
- sunken eyes or cheeks
- fever

If left untreated, severe dehydration can cause serious health problems:

- organ damage
- shock—when low blood pressure prevents blood and oxygen from getting to organs
- coma—a sleeplike state in which a person is not conscious

Other signs and symptoms may include

- bloating
- cramping
- fatigue, or feeling tired
- foul-smelling stool
- heartburn
- too much gas
- vomiting
- weakness

People with short bowel syndrome are also more likely to develop food allergies and sensitivities, such as lactose intolerance. Lactose intolerance is a condition in which people have digestive symptoms—such as bloating, diarrhea, and gas—after eating or drinking milk or milk products.

Read more in *Lactose Intolerance* at [www.digestive.niddk.nih.gov](http://www.digestive.niddk.nih.gov).

## What are the complications of Short Bowel Syndrome?

The complications of short bowel syndrome may include

- malnutrition
- peptic ulcers—sores on the lining of the stomach or duodenum caused by too much gastric acid
- kidney stones—solid pieces of material that form in the kidneys
- small intestinal bacterial overgrowth—a condition in which abnormally large numbers of bacteria grow in the small intestine

## How is Short Bowel Syndrome diagnosed?

A health care provider diagnoses short bowel syndrome based on

- a medical and family history
- a physical exam
- blood tests
- fecal fat tests
- an x-ray of the small and large intestines
- upper gastrointestinal (GI) series
- computerized tomography (CT) scan

### Medical and Family History

Taking a medical and family history may help a health care provider diagnose short bowel syndrome. He or she will ask the patient about symptoms and may request a history of past operations.

### Physical Exam

A physical exam may help diagnose short bowel syndrome. During a physical exam, a health care provider usually

- examines a patient's body, looking for muscle wasting or weight loss and signs of vitamin and mineral deficiencies
- uses a stethoscope to listen to sounds in the abdomen
- taps on specific areas of the patient's body

### Blood Tests

A blood test involves drawing a patient's blood at a health care provider's office or a commercial facility and sending the sample to a lab for analysis. Blood tests can show mineral and vitamin levels and measure complete blood count.

### Fecal Fat Tests

A fecal fat test measures the body's ability to break down and absorb fat. For this test, a patient provides a stool sample at a health care provider's office. The patient may also use a take-home test kit. The patient collects stool in plastic wrap that he or she lays over the toilet seat and places a sample into a container. A patient can also use a special tissue provided by the health care provider's office to collect the sample and place the tissue into the container. For children wearing diapers, the parent or caretaker can line the diaper with plastic to collect the stool. The health care provider will send the sample to a lab for analysis. A fecal fat test can show how well the small intestine is working.

### X-ray

An x-ray is a picture created by using radiation and recorded on film or on a computer. The amount of radiation used is small. An x-ray technician performs the x-ray at a hospital or an outpatient center, and a radiologist—a doctor who specializes in medical imaging—interprets the images. An x-ray of the small intestine can show that the last segment of the large intestine is narrower than normal. Blocked stool causes the part of the intestine just before this narrow segment to stretch and bulge.

## Upper Gastrointestinal Series

Upper GI series, also called a barium swallow, uses x rays and fluoroscopy to help diagnose problems of the upper GI tract. Fluoroscopy is a form of x ray that makes it possible to see the internal organs and their motion on a video monitor. An x-ray technician performs this test at a hospital or an outpatient center, and a radiologist interprets the images.

During the procedure, the patient will stand or sit in front of an x-ray machine and drink barium, a chalky liquid. Barium coats the esophagus, stomach, and small intestine so the radiologist and a health care provider can see the shape of these organs more clearly on x-rays.

A patient may experience bloating and nausea for a short time after the test. For several days afterward, barium liquid in the GI tract causes white or light-colored stools. A health care provider will give the patient specific instructions about eating and drinking after the test. Upper GI series can show narrowing and widening of the small and large intestines.

Read more in *Upper GI Series* at [www.digestive.niddk.nih.gov](http://www.digestive.niddk.nih.gov).

## Computerized Tomography Scan

Computerized tomography scans use a combination of x-rays and computer technology to create images. For a CT scan, a health care provider may give the patient a solution to drink and an injection of a special dye, called a contrast medium. CT scans require the patient to lie on a table that slides into a tunnel-shaped device that takes x-rays.

An x-ray technician performs the procedure in an outpatient center or a hospital, and a radiologist interprets the images. The patient does not need anesthesia. CT scans can show bowel obstruction and changes in the intestines.

## How is Short Bowel Syndrome treated?

A health care provider will recommend treatment for short bowel syndrome based on a patient's nutritional needs. Treatment may include

- nutritional support
- medications
- surgery
- intestinal transplant

## Nutritional Support

The main treatment for short bowel syndrome is nutritional support, which may include the following:

- **Oral rehydration.** Adults should drink water, sports drinks, sodas without caffeine, and salty broths. Children should drink oral rehydration solutions—special drinks that contain salts and minerals to prevent dehydration—such as Pedialyte, Naturalyte, Infalyte, and CeraLyte, which are sold in most grocery stores and drugstores.

- **Parenteral nutrition.** This treatment delivers fluids, electrolytes, and liquid vitamins and minerals into the bloodstream through an intravenous (IV) tube—a tube placed into a vein. Health care providers give parenteral nutrition to people who cannot or should not get their nutrition or enough fluids through eating.
- **Enteral nutrition.** This treatment delivers liquid food to the stomach or small intestine through a feeding tube—a small, soft, plastic tube placed through the nose or mouth into the stomach. Gallstones—small, pebblelike substances that develop in the gallbladder—are a complication of enteral nutrition. Read more in *Gallstones* at [www.digestive.niddk.nih.gov](http://www.digestive.niddk.nih.gov).
- **Vitamin and mineral supplements.** A person may need to take vitamin and mineral supplements during or after parenteral or enteral nutrition.
- **Special diet.** A health care provider can recommend a specific diet plan for the patient that may include
  - small, frequent feedings
  - avoiding foods that can cause diarrhea, such as foods high in sugar, protein, and fiber
  - avoiding high-fat foods

## Medications

A health care provider may prescribe medications to treat short bowel syndrome, including

- antibiotics to prevent bacterial overgrowth
- H2 blockers to treat too much gastric acid secretion
- proton pump inhibitors to treat too much gastric acid secretion
- choloretic agents to improve bile flow and prevent liver disease
- bile-salt binders to decrease diarrhea
- anti-secretin agents to reduce gastric acid in the intestine
- hypomotility agents to increase the time it takes food to travel through the intestines, leading to increased nutrient absorption
- growth hormones to improve intestinal absorption
- teduglutide to improve intestinal absorption

## Surgery

The goal of surgery is to increase the small intestine's ability to absorb nutrients. Approximately half of the patients with short bowel syndrome need surgery.<sup>2</sup> Surgery used to treat short bowel syndrome includes procedures that

- prevent blockage and preserve the length of the small intestine
- narrow any dilated segment of the small intestine

---

<sup>2</sup>Thompson JS, Weseman R, Rochling FA, Mercer DF. Current management of the short bowel syndrome. *Surgical Clinics of North America*. 2011;91(3):493–510.



- slow the time it takes for food to travel through the small intestine
- lengthen the small intestine

Long-term treatment and recovery, which for some may take years, depend in part on

- what sections of the small intestine were removed
- how much of the intestine is damaged
- how well the muscles of the intestine work
- how well the remaining small intestine adapts over time

## Intestinal Transplant

An intestinal transplant is surgery to remove a diseased or an injured small intestine and replace it with a healthy small intestine from a person who has just died, called a donor. Sometimes a living donor can provide a segment of his or her small intestine.

Transplant surgeons—doctors who specialize in performing transplant surgery—perform the surgery on patients for whom other treatments have failed and who have life-threatening complications from long-term parenteral nutrition. An intestinal-transplant team performs the surgery in a hospital. The patient will need anesthesia. Complications of intestinal transplantation include infections and rejection of the transplanted organ.

A successful intestinal transplant can be a life-saving treatment for people with intestinal failure caused by short bowel syndrome. By 2008, transplant surgeons had performed almost 2,000 intestinal transplantations in the United States—approximately 75 percent of which were in patients younger than 18 years of age.<sup>3</sup>

A health care provider will tailor treatment to the severity of the patient's disease:

- Treatment for mild short bowel syndrome involves eating small, frequent meals; drinking fluid; taking nutritional supplements; and using medications to treat diarrhea.
- Treatment for moderate short bowel syndrome is similar to that for mild short bowel syndrome, with the addition of parenteral nutrition as needed.
- Treatment for severe short bowel syndrome involves use of parenteral nutrition and oral rehydration solutions. Patients may receive enteral nutrition or continue normal eating, even though most of the nutrients are not absorbed. Both enteral nutrition and normal eating stimulate the remaining intestine to work better and may allow patients to discontinue parenteral nutrition. Some patients with severe short bowel syndrome require parenteral nutrition indefinitely or surgery.

<sup>3</sup>Mazariegos GV, Steffick DE, Horslen S, et al. Intestine transplantation in the United States, 1999–2008. *American Journal of Transplantation*. 2010;10(4):1020–1034.

## Can Short Bowel Syndrome be prevented?

People can ask their health care providers about surgical techniques that minimize scar tissue. Scientists have not yet found a way to prevent short bowel syndrome that is present at birth, as its cause is unknown.

## What is Intestinal Adaptation?

Intestinal adaptation is a process that usually occurs in children after removal of a large portion of their small intestine. The remaining small intestine goes through a period of adaptation and grows to increase its ability to absorb nutrients. Intestinal adaptation can take up to 2 years to occur, and during this time a person may be heavily dependent on parenteral or enteral nutrition.<sup>1</sup>

## Eating, Diet, and Nutrition

Researchers have not found that eating, diet, and nutrition play a role in causing or preventing short bowel syndrome.

## Points to Remember

- Short bowel syndrome is a group of problems related to poor absorption of nutrients.
- People with short bowel syndrome cannot absorb enough water, vitamins, minerals, protein, fat, calories, and other nutrients from food.
- The main symptom of short bowel syndrome is diarrhea—loose, watery stools. Diarrhea can lead to dehydration, malnutrition, and weight loss.
- A health care provider will recommend treatment for short bowel syndrome based on a patient's nutritional needs. Treatment may include
  - nutritional support
  - medications
  - surgery
  - intestinal transplant



## Hope through Research

The National Institute of Diabetes and Digestive and Kidney Diseases' (NIDDK's) Division of Digestive Diseases and Nutrition conducts and supports basic and clinical research into many digestive disorders.

Clinical trials are research studies involving people. Clinical trials look at safe and effective new ways to prevent, detect, or treat disease. Researchers also use clinical trials to look at other aspects of care, such as improving the quality of life for people with chronic illnesses. To learn more about clinical trials, why they matter, and how to participate, visit the NIH Clinical Research Trials and You website at [www.nih.gov/health/clinicaltrials](http://www.nih.gov/health/clinicaltrials). For information about current studies, visit [www.ClinicalTrials.gov](http://www.ClinicalTrials.gov).

You may also find additional information about this topic by visiting MedlinePlus at [www.medlineplus.gov](http://www.medlineplus.gov).

This publication may contain information about medications and, when taken as prescribed, the conditions they treat. When prepared, this publication included the most current information available. For updates or for questions about any medications, contact the U.S. Food and Drug Administration toll-free at 1-888-INFO-FDA (1-888-463-6332) or visit [www.fda.gov](http://www.fda.gov). Consult your health care provider for more information.

## For More Information

**Crohn's & Colitis Foundation of America**  
386 Park Avenue South, 17th Floor  
New York, NY 10016-8804  
Phone: 1-800-932-2423 or 212-685-3440  
Email: [info@ccfa.org](mailto:info@ccfa.org)  
Internet: [www.ccfa.org](http://www.ccfa.org)

**The Oley Foundation**  
43 New Scotland Ave., MC-28  
Albany Medical Center  
Albany, NY 12208-3478  
Phone: 1-800-776-OLEY  
(1-800-776-6539) or 518-262-5079  
Fax: 518-262-5528  
Email: [bishopj@mail.amc.edu](mailto:bishopj@mail.amc.edu)  
Internet: [www.oley.org](http://www.oley.org)

## Acknowledgments

Publications produced by the Clearinghouse are carefully reviewed by both NIDDK scientists and outside experts. This publication was reviewed by Carmen Cuffari, M.D., Johns Hopkins University, and Thomas R. Ziegler, M.D., Emory University.

## National Digestive Diseases Information Clearinghouse

2 Information Way  
Bethesda, MD 20892-3570  
Phone: 1-800-891-5389  
TTY: 1-866-569-1162  
Fax: 301-634-0716  
Email: [nddic@info.niddk.nih.gov](mailto:nddic@info.niddk.nih.gov)  
Internet: [www.digestive.niddk.nih.gov](http://www.digestive.niddk.nih.gov)

The National Digestive Diseases Information Clearinghouse (NDDIC) is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK is part of the National Institutes of Health of the U.S. Department of Health and Human Services. Established in 1980, the Clearinghouse provides information about digestive diseases to people with digestive disorders and to their families, health care professionals, and the public. The NDDIC answers inquiries, develops and distributes publications, and works closely with professional and patient organizations and Government agencies to coordinate resources about digestive diseases.

This publication is not copyrighted. The Clearinghouse encourages users of this publication to duplicate and distribute as many copies as desired.

This publication is available at  
[www.digestive.niddk.nih.gov](http://www.digestive.niddk.nih.gov).

The U.S. Government does not endorse or favor any specific commercial product or company. Trade, proprietary, or company names appearing in this document are used only because they are considered necessary in the context of the information provided. If a product is not mentioned, the omission does not mean or imply that the product is unsatisfactory.



**NIH** National Institute of  
Diabetes and Digestive  
and Kidney Diseases

NIH Publication No. 14-4631  
September 2014