



GASTROENTEROLOGY

Department of the
CIUSSS de l'Estrie – CHUS

Intestinal Failure (Short Bowel Syndrome)

Colon preserved

NORMAL FUNCTIONING OF THE INTESTINE

Your intestine is divided into two parts: the small intestine (a.k.a. small bowel) and the large intestine (a.k.a. large bowel).

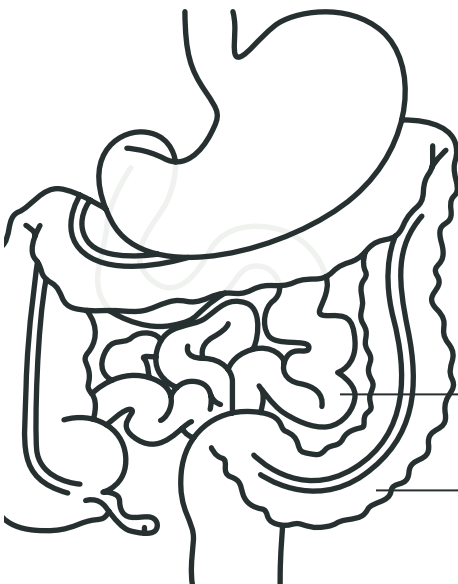
The **small intestine (small bowel)** absorbs the majority of food nutrients. It measures anywhere from 4 to 6 m (15 to 20 ft), depending on the individual, and is subdivided into three parts: duodenum, jejunum, and ileum.

Each part plays a different role in absorbing and digesting nutrients. Nutrient absorption and digestion also depend upon the proper functioning of the pancreas and liver.

In fact, the pancreas secretes enzymes that enable the absorption of sugars, fats, and proteins. Meanwhile, the liver produces bile salts to enable the efficient absorption of fats and of certain vitamins (vitamins A, D, E, and K).

The **large intestine (colon)** measures anywhere from 1 to 1.5 metres (3 to 5 ft), depending on the individual. Its main function is to absorb water and minerals. Bacteria in the colon can also produce the energy your body requires.

When a section of your intestine is removed, the remaining part adapts by increasing its absorption capacity. A significant portion of your intestine can be resected before severe nutritional consequences occur. However, the adaptation process is gradual and may take up to two years.



Small bowel

Colon
(large intestine)

WHAT IS INTESTINAL FAILURE AND HOW IS IT TREATED?

Intestinal failure occurs when the intestine can no longer fulfil its digestive and absorption functions to meet the body's nutritional requirements. There are many causes of intestinal failure, including what is known as short bowel syndrome.

Short bowel syndrome usually results from the resection (exeresis) of a rather long part of the small intestine. The resection leads to the malabsorption of nutrients, minerals, and water. "Short bowel" usually refers to the small intestine's length being less than 2 metres.

Intestinal failure can lead to other symptoms:

- Gas
- Diarrhea
- Abdominal cramps
- Weight loss

Your physician can recommend various medications to alleviate your diarrhea and to improve nutrient absorption. These medications will have an effect on intestinal motility (e.g., Imodium®), on fluid secretion in your intestine (e.g., octreotide), and on your intestinal bacteria (e.g., antibiotics).

You can also help your intestine to adapt and to reduce your symptoms by following a few dietary recommendations.

DIETARY RECOMMENDATIONS

It is important that you speak to your physician or nutritionist about these recommendations. Everyone must follow a nutritional plan tailored to their needs. Do not initiate any restrictive diet before being properly informed.

It is important that you speak to your physician and your nutritionist about nutrition when you suffer from short bowel syndrome. There is no universal nutrition plan. Everyone requires personalized recommendations.

The objective of your nutritional plan is to maximize the work of your remaining intestine, to stimulate its adaptation, to meet your nutritional requirements, to reduce complications associated with nutritional deficiencies, and to reduce your symptoms.

Eat several small meals throughout the day

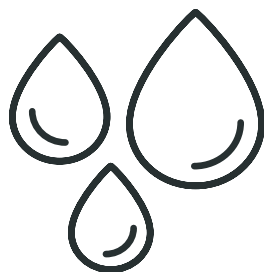
Eating smaller and more frequent meals (6 to 8 daily) will reduce the stress on your intestine. Small meals will help to improve nutrient absorption and digestion. Eat slowly and chew your food well.

Drink liquids between meals rather than during meals

Drink less than ½ cup (125 ml) of liquid during meals. Swallowing large amounts of liquids during meals accelerates the transit of food through the intestine, which can lead to diarrhea and increase the risk of not digesting and absorbing nutrients. Avoid drinking one hour before and after meals.

Integrate sufficient liquids to your diet

- Try to drink 8 glasses of liquids daily (approx. 1.5 litres).
- Drink small sips throughout the day (rather than large amounts all at once).
- Avoid very hot and very cold liquids.
- Drink isotonic liquids (see next page). Avoid drinking too much water.



Avoid liquids that contain too much sugar

It is best to drink isotonic liquids - those have the right concentration of salt and sugar - to foster absorption in your intestine. You can try the following recipes:

Homemade recipes

Recipe 1

- 4 cups water
- ½ teaspoon salt
- ¼ teaspoon potassium-based salt substitute
- ½ teaspoon baking soda
- 2 tablespoons sugar

Recipe 2

- 4 cups water
- 1 cup orange juice
- 8 tablespoons sugar
- ¾ teaspoon baking soda
- ½ teaspoon salt

Recipe 3

- 4 cups Gatorade G2 (sugar free)
- 2½ cups water
- ¾ teaspoon salt

Recipe 4

- ¾ cup apple juice
- 3¾ cups water
- ¾ teaspoon salt

Recipe 5

- ¾ cup raisin or cranberry juice
- 3¾ cups water
- ¾ teaspoon salt

Recipe 6

- 1½ cups Gatorade
- 2½ cups water
- ¾ teaspoon salt

Recipe 7

- $\frac{3}{4}$ cup raisin or cranberry juice
- $3\frac{3}{4}$ cups water
- $\frac{3}{4}$ teaspoon salt

Recipe 8

- $1\frac{1}{2}$ cups Gatorade
- $2\frac{1}{2}$ cups water
- $\frac{3}{4}$ teaspoon salt

Recipe 9

- 1 cube vegetable broth
- 2 cups water
- 1 tablespoon sugar



With these recipes, you can make ice pops (Popsicles) or simply freeze them for later use.

Recipes using commercial rehydration solutions

Recipe 1

- 445 ml (15 oz) Pedialyte®
- 30 ml (1 oz) sorbet

Recipe 2

- 355 ml (12 oz) Pedialyte®
- 60 ml (2 oz) orange juice
- 60 ml (2 oz) Gatorade G2

Recipe 3

- 385 ml (13 oz) Pedialyte®
- 60 ml (2 oz) Diet Ginger Ale (sugar free)
- 30 ml (1 oz) apple juice

Recipe 4

- 415 ml (14 oz) Pedialyte®
- 30 ml (1 oz) ice cream
- 30 ml (1 oz) Diet Ginger Ale (sugar free)

Choose high-salt mineral water

The Vichy and Célestin mineral water brands are high in salt (unlike Perrier and Sam Pellegrino, which are not high in salt).

Avoid hypotonic liquids (salt free)

The following beverages generally do not contain salt and are therefore to be avoided:

- Water
- Coffee
- Tea
- Lemonade or punch
- Soft drinks (except in small amounts and added to a recipe as indicated in the previous pages)



Avoid hypertonic liquids (containing too much salt or sugar)

The following beverages often contain too much salt or sugar and are therefore to be **avoided**:

- Tomato juice (except in small amounts and added to a recipe as indicated in the previous pages)
- Fruit juice (except in small amounts and added to a recipe as indicated in the previous pages)
- Lemonade, punch, iced tea
- Energy drinks (e.g., Red Bull)
- Sweetened soft drinks
- Sports drinks (except in small amounts and added to a recipe as indicated in the previous pages)
- Sweetened ice pops (Popsicles)
- Ice cream (except in small amounts and added to a recipe as indicated in the previous pages)
- Yogurt with added sugar

Eat foods that are rich in protein

The following foods contain an appreciable amount of protein:

- Fish and seafood
- Meat (chicken, turkey, beef, pork, etc.)
- Eggs
- Tofu
- Nuts
- Dairy products (cottage cheese, ricotta cheese, other cheeses, plain yogurt)

Even if they might contain protein, avoid yogurt with added sugar, chocolate, Nutella-type spreads, and fried foods.

SPECIFIC DIET FOR THOSE WITH INTESTINAL FAILURE WITH COLON PRESERVED

Adopt a diet rich in complex carbohydrates

Here are some examples of foods that are high in complex carbohydrates that you can include in your diet:

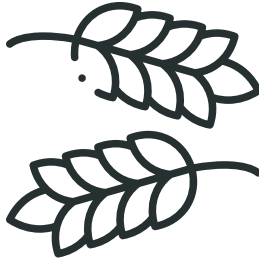
- Bread (including pita, naan), bagels, English muffins
- Rice, including brown rice and wild rice
- Cereal (e.g., Rice Krispies,
- Tortillas
- Corn Flakes), excluding highly sweetened cereal
- Pasta
- Potatoes
- Noodles

Avoid foods that are high in sugar such as donuts, Pop-Tarts and other sweet pastries, honey, maple syrup, molasses, etc.

Choose soluble fibre

Post-surgery, you may find it difficult to digest fibre, especially insoluble fibre. Insoluble fibre is found especially in whole-wheat and bran products. It cannot be digested by your short intestine and it increases stool mass.

In general, soluble fibre is better tolerated and helps to slow down digestion. Foods rich in soluble fibre include soy, legumes (lentils, beans), oats, peanut butter, fruit, pectin and psyllium (e.g., Metamucil®). Speak to your physician before taking fibre supplements.



Soluble fibre

(CHOOSE)

- Unsweetened canned fruit
- Peeled, seedless fruit
- Creamy peanut butter
- Oat products
- Lentils and other legumes
(Caution! Might not be tolerated)

Insoluble fibre

(LIMIT)

- Whole-wheat and bran products
- Fruit and vegetable peels, membranes, and seeds

Foods that are low in fibre

- Corn Flakes, Special K or other cereal with less than 1 g of fibre per serving
- Cream of wheat or cream of rice
- White rice
- White bread

Foods that are hard to digest

- Nuts
- Seeds
- Fruits with peel
- Fruits with seeds
- Dried fruit

OTHER NUTRITIONAL ADVICE TO DISCUSS WITH YOUR PHYSICIAN OR NUTRITIONIST

Low-oxalate diet

If you have an ileal resection (ileum = final section of the small intestine) and your colon (large intestine) is intact, you might have to follow a low-oxalate diet to prevent kidney stones.

Here are some examples of foods rich in oxalate that you must **avoid**:

- Tea
- Instant coffee
- Beer
- Coca-Cola
- Chocolate
- Nuts
- Soy-based products, including tofu
- Leafy greens (e.g., spinach)
- Artichokes
- Sweet potatoes
- Celery
- Tiny fruit (berries)
- Tangerines (mandarins)
- Rhubarb

Speak to your physician or to your nutritionist.

Lactose-free diet

If your physician or nutritionist recommends a lactose-free diet, **avoid** the following foods:

- Milk, cream, ice cream
- Cheese
- Yogurt and other dairy products

Lactose consumption can cause cramps, gas, and diarrhea among certain individuals. Symptoms usually occur within the first 30 minutes after dairy products are ingested. Speak to your physician.

If you are lactose intolerant, **choose** these foods:

- Plant-based beverages (e.g., soy, almond)
- Lactose-free dairy products

You can also purchase lactase capsules or droplets at your pharmacy. This product is used for lactose intolerance.



Fruit

- Eat unsweetened canned fruit.
- Avoid dried fruit, sweetened canned fruit, and undiluted fruit juice.



Vegetables

- Eat radishes, peeled and seeded cucumbers, bell peppers, cooked carrots, tomatoes, and potatoes.
- Avoid broccoli, Brussels sprouts, and onions.



Snacks

- Eat salted snacks (e.g., pretzels, crackers).
- Avoid cereal bars (granola bars) and, for certain individuals, popcorn.



Desserts

- Choose desserts that are not too sweet such as angel cake, Graham crackers, or dried cookies.



Stimulants

- Avoid pie, ice pops (Popsicles), pudding, ice cream, pastries.

Your physician or nutritionist may recommend enteral nutrition or “tube feeding” (via a tube inserted into the body through the nose which reaches the stomach, or via a tube directly connected to the stomach), or parenteral nutrition (intravenous) to meet your nutritional requirements.

It is important that you speak to your physician or nutritionist about these recommendations. The nutritional plan is tailored to each individual. Learn more! Do not initiate any restrictive diet before being properly informed.



If you have any questions or concerns, speak to your nurse or physician.

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