



**G**astro*p*aresis & **D**ysmotilities **A**ssociation

# Small Bowel Bacterial Overgrowth & Digestive Motility Diseases

This pamphlet is one in a series discussing symptoms and symptom management for patients living with **Digestive Motility Diseases**.

## GPDA's

Mission is to provide accurate information to patients; increase awareness to the public and medical community about *Digestive Motility Diseases*; and facilitate the search for a cure

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## What is Digestive Motility?

The digestive tract is a long, hollow, muscular organ which processes your food. This processing action; churning, kneading, mixing with digestive juices, and synchronized waves of propulsion, is called "Motility."

## Altered or abnormal Motility (Dysmotility)

Many diseases of the digestive tract can alter motility and when this occurs, symptoms result.

- Rapid motility may result in diarrhea.
- Spasms or unsynchronized motility may result in painful cramps.
- Increased 'visceral' (gut) sensitivity is not a problem of altered motility, but reflects abnormal sensitivity within the digestive tract's nervous system and be one cause for the sensation of pain.
- Weakened motility or paralyzed motility represents digestive failure.

Digestive Motility Diseases are a group of digestive diseases that share characteristics of weak to paralyzed motility. Any region of the digestive tract can be affected and each region has its own diagnostic label. They are primarily diseases of the enteric nervous system and/or muscles within the digestive tract. **Enteric** is the medical term that refers to the gut. Weakened motility means food and secretions do not move. Instead, they pool and just sit, or are vomited back up. This group of digestive diseases may mimic a bowel obstruction, hence are often called **functional obstructions** or pseudo-obstructions. There is no obstruction to be found, but the obstructive symptoms are the result of faltering motility. These

## The four main types of Digestive Motility Diseases are:

**Gastroparesis (GP):** is the most common. Gastro means stomach and paresis means weakness. It frequently is found in association with dysmotilities of the esophagus and the small intestine.

**Chronic Intestinal Pseudo-obstruction (CIP):** Is the digestive motility disease that primarily affects the small intestines, but is frequently found in association with Gastroparesis and may progress to complete digestive failure.

**Colonic Inertia:** the motility disease that primarily affects the large intestine, and may progress to CIP and GP.

**Achalasia:** is the digestive motility disease that affects the esophagus

## Diseases or Disorders?

This group of digestive diseases has also been called: Gastrointestinal (Digestive) Motility **Disorders**. However, individuals who are severely affected show cellular abnormalities on full-thickness biopsies. Therefore, "disease" is a more accurate term.

# Small Bowel Bacterial Overgrowth

Your doctor may have diagnosed you with **Small Bowel Bacterial Overgrowth (SBBO)**. This pamphlet will help to explain the problem, the signs and symptoms of this disorder, and treatments to correct it. For patients with digestive motility diseases this is a frequently occurring, serious disorder, that is treatable, but often overlooked.

## What are the symptoms?

People suffering from digestive motility diseases are already struggling with unrelenting digestive symptoms and weight maintenance problems. Small Bowel Bacterial Overgrowth may compromise weight management and add to the symptom burden. SBBO causes problems with the absorption of nutrients and vitamins from the digestive track, which may lead to malnourishment, vitamin and micro nutrient depletion.

## The common symptoms of SBBO

Symptom severity may vary depending upon the extent of the bacterial overgrowth and the types of bacteria that predominate. Symptoms may also show a pattern of waxing and waning.

Symptoms may persist for years before more serious problems of malnutrition begin to emerge from long standing, bacterial overgrowth.

Common Symptoms (which may show a cyclical pattern) are:

- Abdominal bloating / belching, soon after a meal.
- Bulky, frothy, floating, loose, smelly stools.
- Loud rumbling noises in the belly soon after eating.
- Weight loss.
- Abdominal discomfort, pain, and cramps.
- Problems of nausea and vomiting may increase, especially after meals.

**Not all of these symptoms will be present for everyone.**

**These symptoms may easily be mistaken for the more innocent disorder of Lactose intolerance.**

# Malabsorption and SBBO

Small Bowel Bacterial Overgrowth (SBBO) results in too many bacteria relocating from the “bacteria teeming” large bowel (colon), into the sparsely populated small intestine, and even into the stomach. Bacteria in the colon are normal and healthy. The surface of the colon is different in characteristics and function compared to the small bowel. Therefore, in the colon, high concentrations of bacteria here are welcomed and necessary for our well being.

However, in the small intestine, too many bacteria create havoc with proper nutrition. Overgrowth can occur due to failure of various mechanisms resulting in opportunistic bacteria overpopulating the small intestine.

For energy, growth and weight maintenance, a healthy small intestine is needed for absorption of all our nutrients and calories. When this region of the gut becomes overgrown with bacteria, the bacteria compete for the nutrients and give off irritating by-products that can inflame and damage the absorptive surface of the small bowel. This competition and damage interferes with the absorption of fats, fat soluble vitamins, carbohydrates (sugars) and in severe situations, even proteins. The deterioration of the small bowel’s ability to absorb nutrients creates malabsorption and malnourishment. These bacteria also, create a good deal of ‘gas’ (hydrogen or methane) as they ferment food coming down the digestive tract (see our educational pamphlet on “Gas, Bloating, and Belching”).

## Problems created by SBBO.

- **Poor digestion of sugars:** These symptoms will vary in intensity depending upon how much sugar you eat. Symptoms are: watery diarrhea, gas, bloating, belching, and cramping.
- **Vitamin B 12 deficiency:** may result from the bacteria utilizing the B12, rendering it unavailable for absorption. Causes anemia.
- **Vitamin A deficiency:** may occur resulting in night blindness, sensitivity to sun light, and other vision problems as well as skin changes.
- **Vitamin D deficiency:** may lead to bone softening and joint pain.
- **Vitamin E deficiency:** may lead to nervous system problems.
- **Calcium / Magnesium deficiency:** this will cause problems with tetany, a medical term for the painful intermittent muscle cramping that occur in the toes, fingers or calves.
- **Poor digestion of fats:** results in weight loss and ‘steatorrhea,’ a medical term for stools that have excess amounts of fat. The stool is characterized by: foul smelling, loose, floating and greasy appearance.
- **Poor digestion of proteins:** results in increased susceptibility to infections, weight loss, and hair loss.

## What this means.

The inability to properly digest nutrients leads to weakness, fatigue and a subtle array of symptoms along with: progressive weight loss, excessive gas (flatus), bulky and foul-smelling stools, abdominal distention, muscle wasting, bone pain, tetany, tingling in fingers and toes, sore tongue, skin changes (dermatitis) hair loss and increased susceptibility to infections.

### Protective mechanisms

A number of protective mechanisms help to stabilize the balance between a normally high density of bacteria in the colon, and a normally low density of bacteria found within the small intestine.

In the stomach, this protection is gained from stomach acid and the valve between the stomach and small intestine. This valve, called the pylorus, controls the flow of contents in a one-way direction toward the intestines.

In the small intestine 3 key mechanisms are at work protecting from bacterial overgrowth. 1) Strong propulsive waves (motility) originating within the stomach and sweeping down towards the colon. These are termed the “house keeping waves,” and sweep the remnants of a meal on to its final journey; 2) Stomach acid, bile, and pancreatic juices all help to keep bacteria in check; and, 3) The valve at the end of the small intestine, called the ileocecal valve. This valve acts as a physical barrier to prevent Colon bacteria from relocating into the small intestine.

People who suffer from digestive motility diseases usually have lost some of these protective measures. The most common failures are:

- **Weak motility** and the loss of strong “house keeping waves.”
- **Acid suppressing medication** used to combat heartburn can help to compromise the protection of stomach acid against bacteria.

## Risk factors for developing SBBO

- Intestinal or stomach by-pass surgeries.
- Adhesions (scar tissue) from previous digestive surgeries.
- Diverticula.
- Irritable Bowel Syndrome (IBS).\*
- Pseudo-obstruction.
- Idiopathic Gastroparesis.
- Diabetic autonomic neuropathy (Gastroparesis)
- Chronic diarrhea related to diabetes\*\*
- Advanced age (75 years and older)
- Scleroderma.
- Acid suppressing medications.
- Chronic inflammation in the stomach (gastritis), or small intestines.
- Crohn’s disease.
- Liver disease.
- Pancreatic disease.

Patients who are on Total Parenteral Nutrition (TPN) – a special type of intravenous feeding – have an increased risk of developing SBBO. These patients are caught in a tough situation since the TPN is needed to treat malnourishment yet this treatment can promote SBBO and intensify malnourishment. Fortunately there are good treatments for keeping SBBO under control.

\*Irritable Bowel Syndrome (IBS) may, in some situations, actually be SBBO. A few studies have found a high rate of SBBO in patients diagnosed with IBS- constipation predominate or IBS alternating with diarrhea. Those patients who were primarily methane producers had a higher rate of constipation, while hydrogen producers had more problems with diarrhea. Regardless, when the bacterial overgrowth was treated, and patients re-tested to confirm the eradication of the overgrowth, their IBS symptoms cleared-up as well.

\*\*Diabetics who are not suffering from Gastroparesis, often suffer from chronic diarrhea. Research has show that 20 to 40% of these patients have diarrhea due to SBBO.

## The impact

Bloating after a meal, the feeling of fullness, along with other upper digestive symptoms of nausea and belching can be quite intense due to SBBO. Abdominal distention can be so pronounced as to place pressure on the diaphragm and make breathing difficult. Patients begin avoiding food so as to not trigger these symptoms. This creates a vicious cycle increasing feelings of fatigue and debilitation.

Finally, some patients may experience an intense desire for ‘sweet’ foods. In a small number of patients, this can actually lead to weight gain.

## Testing for SBBO

There are many different ways to test for Small Bowel Bacterial Overgrowth.

– **Hydrogen Breath Test** is the most commonly used test to determine SBBO. The patient drinks a liquid containing a carbohydrate--lactulose, glucose or sucrose. Breath samples are collected at 15 minute to half hour intervals up to 120 minutes. The collected exhaled air is tested for hydrogen concentration. How it works: Bacteria ingest the carbohydrate, and give off hydrogen as a by-product that is absorbed into the blood stream and released through the lungs.

Patients suffering with digestive motility diseases have delayed gastric emptying and often, delayed intestinal transit. This may effect the testing and necessitate running the test for a longer duration. This is not pleasant for patients who are feeling nauseated. You may ask your doctor about an alternative test for SBBO.

Some centers now also include a test for methane. Methane is a biologically active gas and can contribute to problems of constipation.

### Other tests

- ~ Serum: d-lactic acid, folate and or B12 levels (blood tests)
- ~ Urine test for 4-hydroxyphenylacetic acid (organic acid test).
- ~ 72 hour fecal fat content test.
- ~ Complete Blood Count looking for anemia secondary to low Iron or low B12 levels.
- ~ Fluid samples drawn from an intestinal endoscopy.

## Treating SBBO.

Once SBBO has been identified, treatment can take place.

### Diet:

Initial treatment, for less severe cases of SBBO, can be attempted by **altering the diet**. This approach will not be for everyone since it requires restricting dietary carbohydrates and increasing fats. To have success the diet should be rigidly adhered to every day.

Usually, patients suffering with upper digestive motility diseases (like Gastroparesis) are advised to avoid fats since this further slows the stomach’s emptying and increases symptoms. Therefore, a dietitian should be consulted.

Patients with enteral feedings (a tube surgically placed into the small intestine for liquid feedings) can consult with their dietitian and try a different enteral formula. Usually a formula with a higher fat content is recommended.

### Medications:

A variety of antibiotics are available for treating more severe forms of SBBO. In some situations, two different antibiotics may need to be taken. Once severe overgrowth has been brought under control, an individual may need to ‘cycle’ with a regimen of antibiotics, taking them for several days out of each month.

Examples of some medications used to treat SBBO

- Augmentin (Amoxicillin™)
- Bactrim
- Keflex
- Gentamicin (Garamycin™, Gentacidin™)
- Metronidazole (Flagyl™)
- Tetracycline
- Colistin
- Rifaximin\*

The choice of antibiotics is based upon cultures of samples taken from the patient and the doctor’s clinical experience.

Steroids may be used for a short duration in patients with inflammation resulting from severe SBBO.

Rifaximin is becoming a first line treatment choice by many gastroenterologist. It is a poorly absorbed antibiotic, therefore works primarily in the gut with very few unwanted side-effects.

### **Acid suppressing drugs:**

In consultation with your doctor, try to avoid these medications or decrease the dosage. These drugs are helpful for acid reflux, but can create problems with SBBO because they suppress an important protection from bacteria – stomach acid!

### **Probiotics:**

The use of probiotics, or what are also known as ‘good bacteria’ is a treatment option for mild cases of bacterial overgrowth. Probiotics are ‘safe’ bacteria, normally found in the human gut. Some have been studied in clinical trials and found to be effective in treating a variety of gut maladies. Some organic yogurts contain 5 or 6 of these healthy living bacterial species. Go easy with these probiotics, since taking a high dosage can actually cause diarrhea!

### **Cholestyramine:**

Is a substance that helps to ‘bind’ bile salts and reduce diarrhea. It is used to treat chronic diarrhea in infants where SBBO is suspected and in post cholecystectomy (gallbladder removal) causes of diarrhea.

## **S**upport for treatment

Bacterial overgrowth can be very damaging to the lining of the small intestine. It can cause inflammation, and in severe cases, even intestinal bleeding. Once the overgrowth has been successfully treated, it can take 6 months or longer for the damaged tissue to heal. During this healing process, the intestine may not be able to adequately digest sugars (please see our educational pamphlet on: “GAS, BLOATING, BELCHING”). If a diet high in sugar is eaten, it will bring on symptoms similar to the SBBO.

During this time of healing and maintenance, it is important to restore minerals and vitamins, especially the ‘fat soluble’ vitamins: A, E and D. Probiotics may be helpful in this restorative phase and injections of B12 may also be recommended by your doctor as well as iron supplements to help correct or prevent anemia.

Digestive motility diseases pose a major challenge to restoring good nutrition to help heal the gut from bacterial overgrowth. Again, consultation with a dietitian is imperative in order to find the right balance of nutrients that can be tolerated with upper digestive symptoms caused by the primary motility disease.

Patients with digestive motility diseases, like Gastroparesis and CIP, and who can still take food in by mouth, may better tolerate liquid and semi soft foods.

Liquid meal substitutes, or nutrient drinks, provide completed nutrition and are available at food and drug stores. They come in a variety of brand names and a variety of fat content. They are better tolerated and tend to produce less intense symptoms after consumption.

You may need to experiment with foods to learn your dietary boundaries and what you are able to tolerate. Working with a dietitian you can devise a list of foods to ‘experiment’ with through elimination and then slow reintroduction.

Patients on enteral formulas will need to review their formula preparation with their dietitian. There are many different formula preparations to try.

Finally, patients on TPN feedings (total parenteral nutrition) are generally encouraged, if possible, to still try and take some soft foods by mouth. This can help reduce the risk of SBBO. Also, ask your doctor and dietitian regarding the replacement of 2% of the amino acids in TPN solution with glutamine. The Amino acid, glutamine has shown to protect the gut from an immune dysregulation and SBBO.

## **R**esources

**The Oley Foundation:** [www.oley.org](http://www.oley.org)

Toll free in the US: 1-800-776-Oley

Out side the US: 1-518-262-5079

This non-profit association provides information “on-line,” or support by phone, to patients dependent upon Enteral or Parenteral nutrition.

**Nutrition news and on-line information** regarding diets for digestive motility diseases, visit:

[www.digestedistress.com](http://www.digestedistress.com)

**The National Institute of Diabetes, and Digestive and Kidney Diseases (NIDDK)**, has a library of ‘on-line’ patient education information: <http://digestive.niddk.nih.gov/>