



# Pancreatic Exocrine Insufficiency

When the pancreas is healthy, it produces several enzymes, which are a group of proteins that work as catalysts in digestion. It secretes these enzymes into the small intestine where they work to help digest food. These different enzymes digest carbohydrates (amylase), proteins (proteases including trypsin and chymotrypsin), and fats (lipase). In individuals with pancreatic exocrine insufficiency (PEI), the pancreas doesn't make enough of these enzymes to adequately break down food into absorbable components. This can lead to serious nutritional deficiencies, and the symptoms these deficiencies cause. However, with medications and dietary changes, it is possible to manage PEI.

## Causes

PEI does not occur on its own, but rather is a consequence of pancreatic damage. Causes of this damage include chronic pancreatitis, alcohol abuse, pancreatic cancer, type 1 diabetes, genetic disorders such as cystic fibrosis or Shwachman-Diamond syndrome, inflammation from digestive diseases such as Crohn's disease or celiac disease, or as a complication from surgery on the pancreas or nearby parts of the digestive tract. To learn more about chronic pancreatitis, contact us and ask for our free *Pancreatitis* pamphlet.

## Symptoms

The most common symptom of PEI is fatty stools (steatorrhea). Steatorrhea occurs when the digestive system is unable to absorb dietary fats. Instead, these fats pass through the intestinal tract with waste products. The stools tend to be oily, large, pale, very foul-smelling, and often float in toilet water and stay in the toilet bowl, even after flushing. Individuals with steatorrhea sometimes experience fecal incontinence or oily leakage. Intestinal gas and bloating can also occur from the fermentation of undigested food in the colon.

Many individuals with PEI will experience nutritional deficiencies, especially of fat-soluble vitamins such as A, D, E, and K, since they are not taking in enough fats to help absorb these vitamins. PEI can also cause weight loss, because patients do not get enough calories from the food they eat. Weight loss is more common in those who have PEI in addition to a digestive

disease, such as Crohn's disease. In children, these factors can also result in a failure to thrive.

Some symptoms of nutrient malabsorption, and their typical causes, include:

- fatigue (not enough calories or various nutritional deficiencies)
- anemia (vitamin B-12 or iron deficiency)
- bone disease (vitamin D deficiency)
- bleeding disorders, including bleeding easily, problems forming clots, bleeding under the skin, and blood in the feces or urine (vitamin K deficiency)

## Diagnosis

The symptoms of PEI are often similar to other gastrointestinal illnesses, which can make diagnosis difficult. However, since PEI is caused by other ailments, your physician can establish if it is likely that you have PEI based on your medical history. They will ask you questions about your current symptoms and history, then perform diagnostic tests if they suspect PEI, or if they wish to rule out other diseases or disorders.

**Stool tests:** your physician will provide you with a container and ask you to collect a stool sample when you are able to, which you will then return to their office or directly to the lab. Then, lab technicians analyze the sample. There are two types of stool tests your physician might order. The first one is the **fecal elastase test**, which looks for the quantity of an enzyme called elastase in the stool. Those with PEI often have lower levels of elastase in their stool than individuals without PEI. The second type is a **fecal fat test**, which lets your physician learn how much fat is in your stool. This can show them how well you're absorbing fats.

## Management

It is important to treat the underlying cause of PEI, and these treatments will vary depending on the cause. However, there are options available that make it easier for the body to break down and absorb nutrients, which can help reduce the steatorrhea and nutritional deficiencies that PEI causes.

## Lifestyle Changes

Eat multiple, small meals spaced throughout the day, rather

than one or two large meals. It is easier for your small intestine to absorb nutrients when there isn't as much food to digest at once. Fatty foods can worsen steatorrhea, but it is still important to consume enough fat for necessary bodily functions and because fats are required to absorb certain vitamins. Just ensure that it is primarily from either plant sources – such as nuts, seeds, or olives – or from fatty fish, rather than from processed foods or red meat. And while fibre is good for gut health, for many individuals with PEI it is better to keep fibre intake low, as this can make digestion easier. Underweight individuals will need to focus on high-calorie foods, to get enough energy for optimal health. If you have PEI, it is a good idea to consult with a registered dietitian, who can work with you to establish a meal plan tailored to your lifestyle, that maximizes the nutritional quality of what you eat, and reverses any nutritional deficiencies.

Blood tests allow your physician to analyze levels of different micronutrients in your blood and then recommend supplements to help bring these levels back to normal.

Avoid drinking alcohol and smoking cigarettes, as these products can be damaging to the pancreas, especially in those who have PEI from chronic pancreatitis or pancreatic cancer.

## Enzyme Therapy

The most effective treatment for PEI is pancreatic enzyme replacement therapy (PERT), which involves taking a medication called pancrelipase (Cotazym®, Creon®, Pancrease® MT) to provide the body with enzymes that break down fats and proteins. Those with PEI must take PERT with each meal or snack that contains fat and/or protein. When you consume PERT with food, it duplicates the normal digestive process because the enzymes mix with the food and help you absorb more nutrition from the food and supplements that you consume.

You will need to work with your healthcare team to establish dosage for PERT. The amount of enzymes needed varies from person-to-person and meal-to-meal, with large, fatty meals requiring more enzymes than small, low-fat meals. PERT is a safe treatment, without any known serious side effects.

## Outlook

With pancreatic enzyme replacement therapy and some changes to dietary adjustments, you can manage symptoms of pancreatic exocrine insufficiency. However, it is most important to work with your healthcare team to treat the underlying cause of PEI.

## About the Gastrointestinal Society

The GI (Gastrointestinal) Society is a registered Canadian charity committed to improving the lives of people with gastrointestinal and liver conditions, supporting research, advocating for appropriate patient access to healthcare, and promoting gastrointestinal and liver health.

Want to learn more on this subject? The *Inside Tract*®, the GI Society's quarterly newsletter, provides the latest on digestive and liver research, disease and disorder treatments (e.g., medications, nutrition), and a whole lot more. If you have any kind of digestive problem, then you will want this timely, informative publication. **Subscribe today!**

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