

# Nutrition Management Following Pancreatic Surgery

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## Medical Nutrition Therapy Goals

- Prevent or reverse poor nutrition
- Maintain dose and schedule of cancer treatments
- Manage symptoms
- Maintain or improve weight and strength
- Maximize quality of life

## Nutrition After Whipple Procedure

We are often not able to achieve normal fat absorption after a Whipple.

Goals:

- Reduce diarrhea
- Restore adequate nutrition
- Prevent weight loss
- Decrease symptoms

## Nutrition After Whipple Procedure (short term)

Immediately following surgery:

- May or may not have a jejunostomy feeding tube. If you have a j-tube, feeding will generally be cycled to night time
- Start oral diet with clear liquids and advance to "regular"
- Generally: smaller meals, avoid greasy and fried foods, avoid raw fruits and vegetables (to start)

## Nutrition After Whipple Procedure (long term)

- Avoid fried, high fat, and greasy foods
  - Types of fats consumed should be from healthy sources: olive/canola/peanut oil, nuts, seeds, avocado
- Aim for 5-9 serving fruit and vegetables per day as tolerated.
- Take enzymes. Take acid reducing medication.
- Exercise at least 30 minutes per day most days. Weight training/lifting start as advised by your surgeon.

## Nutrition After Whipple Procedure

- Dumping
- Delayed gastric emptying
- Poor appetite
- Glucose intolerance/diabetes
- Lactose intolerance
- Pancreatic Insufficiency

## Dumping

- Limit portion sizes
- Drink liquids between meals rather than with meals
- Avoid foods high in sugar (including fruit juices)
- Avoid hot liquids
- Add soluble fiber, guar gum (Benefiber®)

## Early Satiety/Delayed Gastric Emptying

- Find creative ways to alleviate gas and bloating
- Try liquids in between meals
- Small servings, more often
- High fat or fried foods may be problematic for some
- High fiber foods may be problematic

## Poor Appetite

- Size, number and timing of meals during the day, temperature of foods
- Stress at mealtime
- Preparation, presentation, and plan day before
- Light exercise and activity
- Add flavor; taste changes?
- Nutrient dense foods
- Medication?

## Nutrition and Glucose Intolerance/Diabetes

- Follow a carbohydrate controlled diet.
- Consume high fiber carbohydrate foods.
- Limit refined carbohydrates.
- Eat carbohydrates in combination with protein and fats.

## Possible Causes of Diarrhea

### Panc. Insufficiency

- Feelings of indigestion
- Cramping after meals
- Large amounts of gas
- **Foul smelling gas or stools**
- **Floating stools or greasy/fatty stools**
- Frequent stools
- Loose stools

### Lactose Intolerance

#### After a meal containing dairy:

- Feelings of indigestion
- Cramping after meals
- Large amounts of gas
- Loose stools

### Bacterial Overgrowth

- Feelings of indigestion/cramping
- Foul smelling stools
- Frequent stools
- Loose stools

## Possible Treatments of Diarrhea

### Panc. Insufficiency

enzymes

### Lactose Intolerance

Lactose free dairy or lactase

### Bacterial Overgrowth

antibiotics

## Nutrition Management of Diarrhea

- Discuss with your medical team which medications may be appropriate. Pancreatic enzymes? Lactase enzymes? Anti-diarrhea?
- During diarrhea (of any cause) limit/avoid:
  - Lactose containing dairy products (However, products with live active cultures: yogurt and buttermilk are okay.)
  - High fiber foods: whole grains, raw fruits with thick peels, raw vegetables
- Get plenty of fluids

## Pancreatic Insufficiency

- Occurs in 25% of patients post-Whipple, observation is occurrence much greater with Whipple plus radiation.
- Reduction of pancreatic enzyme output to below 10% of normal
- Symptoms can occur upon diagnosis or during treatment or following surgery

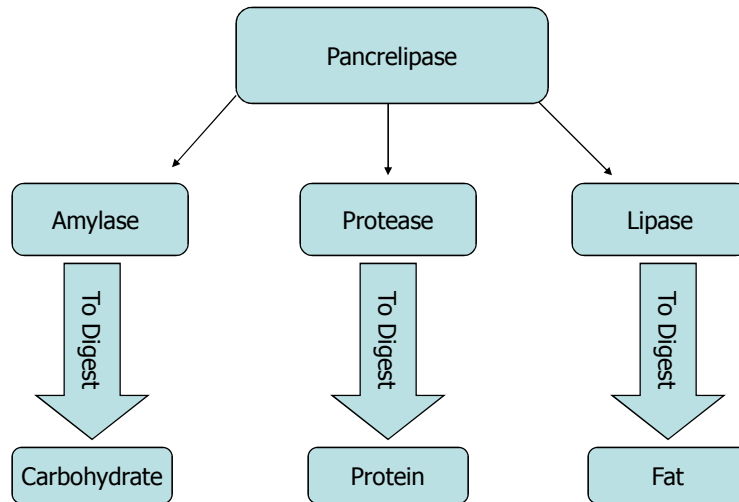
## Symptoms of Pancreatic Exocrine Insufficiency

- Feelings of indigestion
- Cramping after meals
- Large amounts of gas
- Foul smelling gas or stools
- Floating stools or greasy/fatty stools
- Frequent stools
- Loose stools/diarrhea
- Unexplained weight loss

## Pancreatic Enzymes (Pancrelipase)

- Patients who have pancreatic insufficiency due to disease, treatment, or surgery should take supplemental pancreatic enzymes.
- Goals
  - Eliminate diarrhea
  - Restore adequate nutrition
  - Prevent weight loss
  - Decrease symptoms

## What is pancrelipase?



## What does the number after the name mean?

- The number helps identify the units of lipase in each capsule/tablet.
- To know how many units of lipase are in your pill multiply the number after the name by 1000.
- Examples:
  - Ultrase<sup>®</sup> MT 12 (12 x 1,000) = 12,000 units of lipase per pill.
  - Creon<sup>®</sup> 10 (10 x 1,000) = 10,000 units of lipase per pill.

## Finding the right enzyme and how much to take.

- Every person is different and needs different amounts of pancreatic enzymes. Amounts needed may vary depending on disease and treatment.
- One brand/batch may work better than another so it is best to start with one brand find the dose that works for you and stick with it.
- Units of lipase can be used to determine a starting dosage of enzymes.

## Enzyme Dosage: Starting

**4000 units lipase per 5-7 grams fat**  
(Ottery F, Oncology. 1996;9S:26-32)

And if you have too much on your mind to count fat grams...

**Start by taking 20,000-30,000 units of lipase before/with meals and 10,000 units of lipase before/with snacks.**

## How to Optimize Enzymes:

- It is very important that enzymes be taken at the beginning of the meal or snack. (first bite)
- Enzymes can also be taken throughout the meal.  
**Optimally throughout a meal** (Sarnar M, World J Surg. 2003;27:1192-1195)
- Enzymes generally do not work well if forgotten and taken at the end of a meal.
- Don't take with antacids or iron supplements
- Do take a daily medication to reduce stomach acid. proton pump inhibitor(PPI) or H2 blocker

## How to Optimize Enzymes: Continued

- For best results you should take with every meal and snack that contains fat:
  - Meat
  - Dairy
  - Bread
  - Snacks
  - Desserts
- Capsules should not be sprinkled on dairy products

## Enzyme Dosage: Titration

- Amount of enzymes needed depends on your diet and the speed of your GI tract.
- After starting enzymes follow guidelines for optimization of enzymes and continue to increase amount of lipase per meal/snack until a level is achieved that prevents s/s of pancreatic insufficiency.
- Do not exceed 75,000 units of lipase per meal without discussion with your doctor.

## Trouble Shooting...

- Open capsule and take contents of capsule with 1-2 spoonfuls of soft (non dairy) food. DO NOT chew.
- Tablet form may act more rapidly-but less potent

## Pancreatic Enzymes: Side effects of too many

- Constipation (most common)
  - Nausea
  - Abdominal Cramps
  - Diarrhea
- (Careful not to confuse with symptoms of inadequate enzyme use or chemotherapy or radiation treatment.)

## Can I use a generic?

- FDA-
  - no brand for brand standardization
  - generics may be less standard batch for batch
  - FDA requiring clinical studies and proof of standardization by April 2008.

Brand Name Enzymes	Manufacturer
Creon®	Solvay Pharmaceuticals, Inc.
Pancrease®, Pancrease® MT	Ortho-McNeil Pharmaceutical, Inc.
Pancrecarb® MS	Digestive Care, Inc.
Ultrase®, Ultrase® MT, Viokase®	Axcan Scandipharm, Inc.

## What about enzymes as dietary supplements?

- Not regulated by FDA, no requirement of standardization or purity.
- Plant based enzymes: papain and bromelain- OK, may complement Rx.

## Lactose Intolerance

- May be temporary
- May be able to tolerate low lactose foods
- Provide lactase enzymes prior to a meal—avoid limiting diet
- Replenish good bacteria- probiotics

## Probiotics

- Foods: lowfat/fat free yogurt, buttermilk, temphe. (Use cautiously initially: sauerkraut.)
- Therapeutic foods: specialty yogurts such as DanActive™
- Dietary Supplements: Culturelle®

## Herbal/Vitamin/Mineral Supplements

General:

\*\*Discuss with your medical team.\*\*

Resources:

ConsumerLab: independent product testing

<[www.consumerlabs.com](http://www.consumerlabs.com)>

## Herbal/Vitamin/Mineral Supplements

Resources continued:

The National Institutes of Health Office of  
Dietary Supplements-

<http://dietary-supplements.info.nih.gov>

M.D. Anderson Complementary/Integrative  
Medicine Education Resources-

[www.mdanderson.org/departments/cimer](http://www.mdanderson.org/departments/cimer)

## Long Term Health

- Plant based diet
- Low saturated fat
- 2 ½ - 4 cups of fruits and vegetables per day.
- 30-60 minutes of activity per day
- Use a multiple vitamin/mineral supplement, may need to use a special form of vitamins A, D, E, K:
  - AquaDEKs™
  - Vitamax®
  - Source CF®

## Long Term Health

- Osteoporosis:
  - Calcium need: 1200 mg per day
  - Recommend supplement with calcium citrate (vs. calcium carbonate)
  - Use calcium supplements containing vitamin D
  - Weight bearing activity
  - Bone mineral density study

## Pancreatic Resources

- Pancreatic Cancer Action Network, Inc  
[www.pancan.org](http://www.pancan.org)
- American Cancer Society [www.cancer.org](http://www.cancer.org)
- National Cancer Institute  
[www.nci.nih.gov/cancer\\_information/cancer\\_type/cancer](http://www.nci.nih.gov/cancer_information/cancer_type/cancer)
- American Institute of Cancer Research  
[www.aicr.org](http://www.aicr.org)
- Caring 4 Cancer [www.caring4cancer.com](http://www.caring4cancer.com)

## Resources

- Registered Dietitian: request a consult at your cancer center, if none available contact PanCAN or the American Dietetic Association ([www.eatright.org](http://www.eatright.org))
- Call PanCAN or visit website for tip sheets, booklets, recipes, etc.



## Resources: continued

### Cookbooks:

- Eating Well Through Cancer (by Clegg and Miletello)
- The American Cancer Society's Healthy Eating Cookbook
- *Betty Crocker's Living With Cancer Cookbook* (by Ghosh, Carson and Cohen)
- *Month of Meals: Meals in Minutes* (by American Diabetes Association and American Dietetic Association)

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