

Parkinson's Disease:

**Nutrition
Matters**

by

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NPF Special Edition

FOREWORD

Nutrition does indeed make a significant contribution to the health status of persons living with Parkinson's disease. Kathrynne Holden's clinical and research work led to publication of *Eat Well, Stay Well with Parkinson's Disease*, her handbook for families which brings together crucial elements of nutrition principles related to PD also, *Cook Well, Stay Well with Parkinson's Disease*, a compilation of "Super Foods" of special benefit to those with PD; and her manual for health professionals, *Parkinson's Disease: Guidelines for Medical Nutrition Therapy*.

She has created and now updated this special NPF publication, to bring to the forefront of knowledge issues regarding weight maintenance, protein absorption in the patient who takes levodopa, and other components of healthful living.

Holden has written a very pragmatic guide book reminding us that food matters, fluids matter, vitamins matter.....in short, ***Nutrition Matters***. We at the NPF are indebted to Kathrynne for a comprehensive and readable nutrition manual that will provide invaluable to patients and families.

ABOUT THE AUTHOR



Kathrynne Holden is a registered dietitian who has broken new ground in the field of nutrition for those with Parkinson's disease. Her earlier book *Eat Well, Stay Well with Parkinson's Disease* is in its third printing, and her professional manual *Parkinson's Disease: Guidelines for Medical Nutrition Therapy* is now in hospitals and clinics around the world.

Her aim is to empower people with PD and their families to make the nutritional choices that will allow them to stay healthy, make the best use of levodopa, minimize medication-related side effects, and prevent nutrition-related hospitalizations.

Her work in the area of Parkinson's disease includes written publications and seminars, both for health professionals and for the public; research; and private practice. She also moderates "Ask the Parkinson Dietitian," an internet forum. This allows people around the world to e-mail questions about nutrition for PD. See The National Parkinson Foundation website: <http://www.parkinson.org>

She also maintains her own website: <http://www.nutritionucanlivewith.com>

Kathrynne resides in Colorado with her husband, Steve. They enjoy cooking, gardening, hiking, and birdwatching.

ACKNOWLEDGMENTS

This NPF special edition is partly excerpted from *Eat Well, Stay Well with Parkinson's Disease*, and *Cook Well, Stay Well with Parkinson's Disease*, two books I have written as a result of my work in this area. All these works owe their existence to the generosity, encouragement, and inspiration of others. I would like to thank Dr. Abraham Lieberman, Medical Director of NPF, who conceived the idea of the e-mail forum "Ask the Parkinson Dietitian" so that I could respond to people who might not otherwise have an opportunity to ask questions of a registered dietitian. My thanks also to Dr. Gerald C. McIntosh, Director of the Neurosciences Research Center in Fort Collins, Colorado, who funded my pilot study on nutrition and PD. I also wish to thank all the wonderful people with PD and their families who have taught me so much about caring and caregiving. Very special thanks to my husband, Steve, for patience, troubleshooting, and emotional support.

Kathrynne Holden, MS, RD

TABLE OF CONTENTS

The Significance of Nutrition in Parkinson’s Disease	1
Protein and levodopa.....	10
Constipation	16
PD and Water Needs	20
Bone Health	25
Unintended Weight Loss	29
Recipes and Menus	33
Shopping list.....	47
Recipes	50
APPENDIX A: National Parkinson Foundation	56
APPENDIX B: Diet-related resources	57
APPENDIX C: Parkinson’s and the Internet	58

CHAPTER 1

The Significance of Nutrition in Parkinson's

Why is nutrition of special importance for those with Parkinson's disease (PD)? Nutrition won't cure PD, or slow its progression, so why is it important?

The answer is that PD impacts many aspects of health. It can slow the gastrointestinal tract, causing constipation, slowed stomach emptying, and swallowing problems; it can lead to loss of the sense of smell, and of taste. Medications used to treat PD can cause nausea and appetite loss. And, one of the most important medications, levodopa, must compete with protein for absorption from the small intestine.

People with PD are at increased risk for malnutrition; yet, with attention to diet, you will feel better, ward off nutrition-related diseases, and prevent hospitalization. A stay in the hospital can be costly, traumatic, and painful, but for those with PD, there are additional concerns.

- Some hospital staff members are unfamiliar with the special medications used with PD.
- Timing of medications can be difficult for staff, who may already have complicated schedules in place.

By following good nutrition practices, you'll feel better, and are much more likely to stay healthy and avoid the hospital

What is optimal nutrition for people with PD? There is no single answer. PD affects each individual quite differently; some factors that can change your dietary needs include your age, your gender, whether you have any other diagnosed conditions such as elevated blood pressure, food allergies, diabetes, etc. Also, medications used may have a wide range of side effects that can impact nutritional health. That includes medications for heart disease, blood pressure, and other conditions, as well as PD medications; it also includes many over-the-counter medications.

We will therefore discuss some of the most common concerns, some of which can become serious enough over time to require hospitalization. These include:

1. Bone thinning. Studies have shown that people with PD are at increased risk for bone thinning – both men and women alike. Other research has demonstrated that malnutrition, unplanned weight loss, and falls greatly increase the risk for bone fracture and other disabilities. As PD advances, it can increase the likelihood of falls. For those with PD, therefore, it's especially important to eat meals that provide the bone-strengthening nutrients — particularly calcium, magnesium, and vitamins D and K. Also important is regular exposure to sunlight (which provides vitamin D, a bone-strengthening vitamin), and weight-bearing exercise, such as walking. Nutrients, sunlight, and weight-bearing exercise will help to keep the bones strong, preventing fractures and hospitalization.

2. Dehydration. PD medications can raise the risk for dehydration. Many people with PD don't realize how important water is for health. Dehydration can lead to confusion, weakness, balance problems, respiratory failure, kidney failure, and death. In the United States, dehydration is responsible for about 1.8 million days of hospital care each year (about ten days per patient), and costs more than \$1 billion annually.

3. Bowel impaction. PD can slow the movement of the colon, causing constipation. This makes it extra important to get enough fiber in the daily menu. If not dealt with properly, constipation can lead to a mass of dry, hard feces, impossible to pass normally. This is called *bowel impaction*. People with bowel impaction may require hospitalization, sometimes even surgery.

4. Unplanned weight loss. People with PD often lose weight without meaning to, due to nausea, loss of appetite, depression, and slowed movement. Unplanned weight loss together with malnutrition can lead to a weakened immune system, muscle wasting, loss of vital nutrients, and risk for other diseases. A loss of ten percent of the maximum lifetime adult weight is a predictor for illness and death. For example, if a man's normal adult weight was 150 pounds, and he loses 15 pounds without meaning to -- even if over a period of several years -- he is at increased risk for illness and death.

5. Medication side effects. Medications perform important roles in helping to manage PD symptoms; however, in some people they can have unwanted side effects. Taking more than one medication increases the likelihood of these adverse effects, and it's a good idea to watch carefully for any changes upon starting a new medications.

Furthermore, many people with PD use drugs for other conditions, such as high blood pressure, elevated cholesterol, etc. These medications may also have undesirable side effects or contribute to additive side effects.

Some common side effects of PD medications include:

- nausea
- appetite loss, often followed by weight loss
- edema (fluid retention in the tissues)
- compulsive eating, and weight gain

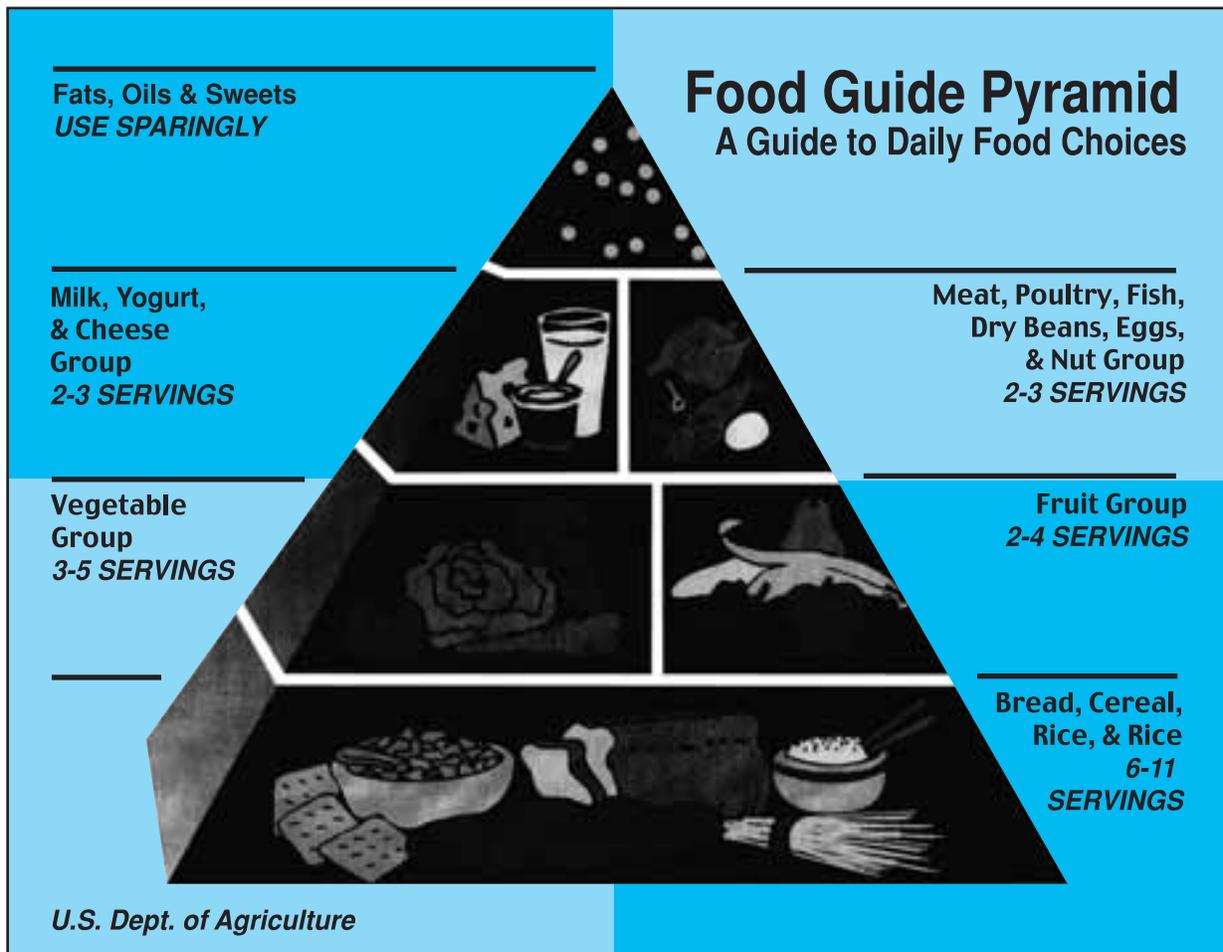


6. Protein-levodopa interaction. One of the most important medications used to treat PD is levodopa (Sinemet, Sinemet CR, Madopar, Dopar, Larodopa, Prolopa, Syndopa). However, levodopa must compete for absorption from the small intestine with proteins in food, and it may be necessary to take care with the timing of meals and medication.

PD is a complicated disease, that affects each person differently. Still, there are many similar needs, such as the need for dietary fiber, fluids, and nutrients, that are common to most people with PD.

Your general nutrition needs

The Food Guide Pyramid can be adapted for use as a general guide to nutrition for those with PD. However, the pyramid does not distinguish among whole-grains vs. refined grains, or plant proteins and animal proteins, and these are important differences for those with PD. Studies have found that a high-fiber diet with plenty of plant foods can enhance the absorption of levodopa, alleviate constipation, and provide the nutrients most needed in PD. So we must adapt the Food Guide Pyramid to obtain the best food choices to combat PD.



A daily menu based on whole grains, with plenty of vegetables and fruits, calcium-rich foods, and smaller portions of high-protein foods is the best possible choice for people with PD. The whole grains contain the fiber that helps control the constipation that often occurs in PD, as well as aiding in the management of blood sugar, blood pressure, cholesterol, and heart disease.

Vegetables and fruits provide the antioxidants, phytochemicals, minerals, and vitamins that nourish and support the muscles, nervous system, and organs of the body. Calcium is particularly important, as it helps keep the bones strong, preventing fractures. And protein keeps the muscular system healthy; strong, toned muscles help to maintain balance and strength.

Isn't it best to eat fresh vegetables and fruits?

Not necessarily. The processes of canning and freezing produce have advanced greatly, so that more nutrients are retained. Ideally, it's best to eat some raw and some cooked or processed produce. However, if chewing or swallowing is difficult, or if it takes too long to eat raw vegetables and fruits, it's fine to eat canned foods or cooked frozen foods.

How many servings should I have daily?

Each group in the Pyramid has a minimum and a maximum number of servings. The Breads and Grains group, for example, recommends six to eleven servings per day. A small or inactive woman needs about six servings, whereas a man or a larger or more active woman needs more servings.

What's a serving size?

Servings are small and not difficult to incorporate into a daily eating plan. Here are some examples:



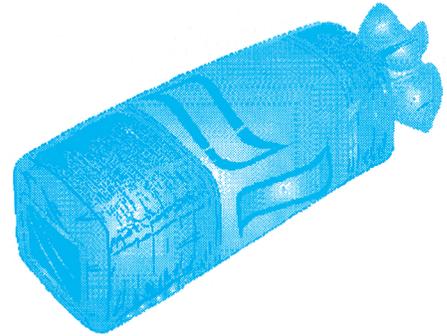
Serving sizes from the food guide pyramid:

Breads and grains group

6-11 servings daily

(Choose whole grain foods as often as possible, rather than refined flours and grains)

- 1 slice bread
- 1 6" corn or flour tortilla
- 1 oz ready-to-eat cereal
- 1/2 cup cooked cereal, rice or pasta
- 4 small crackers
- 2 large crackers
- 1/2 bagel or English muffin

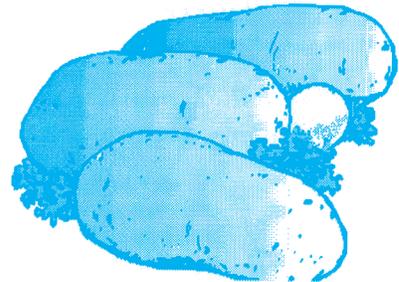


Vegetable group

3-5 servings daily

(Choose several servings of red, yellow, orange, and dark green leafy vegetables each week; these are especially rich in antioxidants)

- 1/2 cup cooked vegetable
- 1/2 cup chopped raw vegetable
- 6 oz vegetable juice
- 1 cup raw leafy greens



Fruit group

2-4 servings daily

(choose several servings of citrus fruits, berries, and cherries each week; these are high in protective phytochemicals and antioxidants)

- 1 medium apple, banana, or orange
- 1/2 cup fresh berries or cherries
- 15 grapes
- 1/2 cup applesauce
- 1/4 cup dried fruit
- 3/4 cup fruit juice



Calcium (dairy) group

3 servings daily

4 oz canned sardines or salmon, including bones

2 cups cooked kale, chard, or collard greens

2 cups cooked navy beans

1 cup milk or yogurt, or fortified milk alternate (such as soy or rice “milks” fortified with calcium and vitamin D)

1 1/2 oz natural cheese

Protein (meat) group

2-3 servings daily

(Choose several servings of cooked dried beans each week, for their fiber, folate, and minerals)

1 cup cooked dry beans, split peas, or lentils

2 large eggs

4 TB peanut butter

2-3 oz cooked meat, fish or poultry



Fats, oils, & sweets

Use sparingly; choose non-hydrogenated vegetable oils and nut butters

Fats: Butter, margarine, sour cream, mayonnaise, salad dressing, oil

Sweets: sugar, jam, jelly, honey, syrup, soft drinks, desserts.

What about taking nutritional supplements, such as vitamins and minerals?

A multivitamin-mineral supplement is a good idea for most people, especially as we age. The aging metabolism is less well able to absorb and use vitamins and minerals, and supplements may help.

However, you should always discuss supplements with your registered dietitian. After age 50, iron supplements are not recommended unless you are anemic. Use of many medications, such as diuretics and blood thinners, in conjunction with supplements, can seriously impact your health. If you are at risk for hemorrhagic stroke, high-dose supplements of vitamin E may not be advisable. Also, some diseases, such as kidney disease, can be worsened by use of supplements. Discussion with a physician and a registered dietitian can help you choose the right supplements in the right amounts for your unique needs. Your pharmacist can help you select inexpensive, high-quality brands.



Vitamin B6 and Parkinson's disease.

Before the combinations of levodopa/carbidopa and levodopa/benserazide were produced, people with PD were prescribed levodopa alone. It was found that vitamin B6 prevented the absorption of the levodopa, so people were advised not to eat foods rich in B6, or to take B6 supplements.

Now, however, the medication commonly used combines carbidopa or benserazide with the levodopa. These “protect” the levodopa, so that vitamin B6 in reasonable amounts is no longer thought to be a problem. It's generally recommended that vitamin supplements for people using carbidopa-lev-

odopa or benserazide-levodopa contain no more than about ten-fifteen milligrams of B6 daily; some people can tolerate more than that, others may be more sensitive. If you are sensitive to B6, or if you need to take very large amounts (over 15 mg), take the B6 at least two hours apart from the levodopa. You should inform your physician if you intend to use such large supplements of B6. Food sources of B6 include chicken, fish, pork, eggs, brown rice, soybeans, oats, whole wheat, peanuts, and walnuts, also fortified products such as cereals.

Bloating, obsessive eating, weight gain.

Some people find that after beginning PD medications, they experience abdominal bloating. They may also find that they have an urge to eat excessive amounts of food, which contributes to both abdominal bloating and weight gain. They may also have edema (fluid retention), often in the feet or lower legs, sometimes in the upper body.

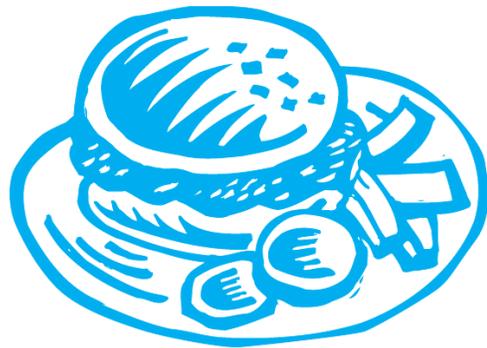
A compulsion to eat should be reported to your doctor. Some people find that counseling is therapeutic and helps them to control the urge to overeat. Edema should also be reported, because it can cause both weight gain and elevated blood pressure.

If you experience edema, it will be important to control salt and sodium intake, because this can aggravate fluid retention in the tissues. Also, increase use of vegetables and fruits, which contain potassium and other minerals that help to flush fluids out of the tissues. It may be helpful to elevate the legs several times a day: sit back with your feet and legs resting on a chair or stool that is the height of the chair you are sitting in. This can help to drain fluids from the feet and legs.

CHAPTER 2

Protein and Levodopa Protein and Levodopa

A combination of levodopa with carbidopa or benserazide, known as the brand name Sinemet, Madopar, and other names, is an important medication used in treating Parkinson's disease. However, there are some barriers to absorption of regular (quick-release) Sinemet/Madopar by the body.



- 1) If you take your Sinemet with a meal, or just after a meal, it may take a very long time for the Sinemet to be absorbed. This is because the stomach takes about one to three hours to empty food. If Sinemet is mixed with food, it takes the same amount of time to clear the stomach as the food does.
- 2) A high-fat meal takes even longer to clear the stomach. Fat is digested very slowly compared to carbohydrate and protein. If Sinemet is taken with a high-fat meal, it is further delayed in clearing the stomach.
- 3) Protein in the meal is broken down in the intestine into amino acids. These aminos must travel across the intestinal wall to get into the blood. Then they must cross the blood-brain barrier to enter the brain. Sinemet also must transit the intestine and the blood-brain barrier using exactly the same carrier system as the amino acids.

Most meals contain a large amount of protein, and the amino acids use up all the “carriers.” The Sinemet must wait until the carriers are free again, in order to cross over into the bloodstream. The same thing happens when Sinemet tries to get to the brain, where it does its work. Once more, amino acids clog all the “carriers” and Sinemet can’t get through to the brain.

Therefore, it’s best to take Sinemet 30 to 60 minutes before eating a meal. This allows the Sinemet to be quickly absorbed before the food can interfere.

PROBLEM: Many people experience nausea when they first begin to use Sinemet. This usually disappears after a few weeks, although some people continue to feel nausea as long as they use Sinemet.

SOLUTION: Take the Sinemet along with some foods that don’t contain protein. Ginger tea is a good choice for many people, because it often “settles the stomach.” A graham cracker or soda cracker along with the ginger tea may help, too — these are very low in protein, and should not interfere with the absorption of Sinemet. You can find ginger tea in health food stores. Ginger ale may also be helpful for some people.

If your nausea is not relieved after a few weeks, discuss this with your doctor, who may wish to prescribe an anti-nausea medication.

What about Sinemet CR/Madopar HBS?

Sinemet CR (“Controlled Release”) and Madopar HBS and their generic forms, are designed to be released slowly into the blood over a long period of time, providing a continuous, smooth, supply of levodopa. It was also designed so that it can be taken with a meal. However, it requires more time to become effective than regular Sinemet, and taking it with food means it will be even longer before it takes effect. If you spend a great deal of time in an “off state” (time when medications are not working) then it may be best to take Sinemet CR 30-60 minutes before eating a meal, just as you do regular Sinemet.

On-off fluctuations. In the early stages of PD, the brain continues to produce dopamine, although in reduced amounts. Medications such as the levodopa in Sinemet boost this amount, so a steady supply of dopamine reaches the brain at all times. Later on, the brain ceases to produce dopamine in any significant amount, and must rely totally on Sinemet. This is when “on-off fluctuations” start to occur.

When levodopa begins to take effect and there is a good dopamine response, the person is said to be “on,” functioning and moving well. As the levodopa begins to lose its effect and movement becomes more difficult; the person is said to be “off” or experiencing a “wearing off” phenomenon. These on-off fluctuations are a common problem in patients who have taken Sinemet for several years.

New medications, such as the agonists ropinerole and pramipexole, and the COMT-inhibitor tolcapone, have greatly extended the effectiveness of levodopa, and decreased “off time.” Nevertheless, in advanced PD, fluctuations can still be a problem.

The nutritional concern at this point is the amino acids previously discussed. These must cross the cells of the intestinal walls to get into the blood, and then must cross the blood brain barrier to get into the brain. These amino acids use exactly the same pathway as levodopa to get into the bloodstream and the brain.

Therefore, a meal high in protein combined with Sinemet can seriously interfere with levodopa absorption, particularly at the level of the brain receptors. Research indicates that many people who experience "on-off" fluctuations can benefit by adjusting their protein intake.

For those wishing to adjust their protein intake, there are three ways currently considered feasible.

1) Balanced protein plan. This is the plan I highly recommend. With the help of a registered dietitian, determine your protein needs; if you are otherwise healthy, this will be about 1/2 gram of protein per pound of body weight per day. Then, divide this amount equally among three meals, morning, mid-day, and dinner.

For most people, this will result in less protein than the typical western diet provides; also, it will be evenly divided, providing for more consistent levodopa absorption. Be sure to take the levodopa at least 30 minutes before meals; if you need to eat snacks between meals, choose those with little or no protein – fruit, juices, etc.



2) Evening protein. I do not recommend you attempt this plan without the assistance of a registered dietitian. High-protein foods are eaten only in the evening, so that mobility is improved during the day. This plan is not ideal, however, because mobility is greatly reduced during the nighttime, and many people find they have difficulty turning in bed, or getting up at night. Some people then forego eating any protein in the evening, so as to have better control of PD symptoms throughout the night; such deprivation leads to protein starvation and illness, even hospitalization. If you are extremely protein-sensitive, ask for a referral to a registered dietitian, who can assess your protein needs and help you plan a safe and effective “evening protein menu.”

3) High-carbohydrate (high-carb) plan. Eat meals that consist of a ratio of five-to-seven parts carbohydrate to one part protein (5:1 to 7:1).

In the small intestine, carbohydrate breaks down into glucose, and enters the bloodstream. Protein breaks down into amino acids, which enter the bloodstream with glucose. A high ratio of carbohydrate to protein causes a large amount of insulin to be released into the blood. Insulin removes some of the amino acids from the blood and may help lower the competition between aminos and Sinemet.

The high-carb meal plan appears to work well for about two-thirds of the people who try it. It allows small amounts of protein throughout the day, and a more natural menu. It has disadvantages, however:

- it is difficult to understand and plan meals and recipes in such a high ratio
- it is very difficult to devise a menu under 1800 calories per day, and this is too much food for some people
- it is difficult to eat meals away from home – restaurants, friends' homes, and traveling all pose problems for those wishing to maintain a high-carb diet plan.
- furthermore, a high-carb diet could make some conditions, like diabetes, lung disease, and high serum triglycerides, much worse.

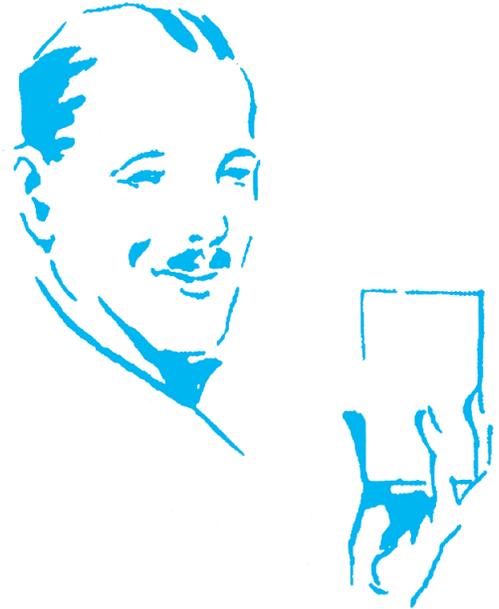
A high-carb menu plan should only be undertaken with the help of a registered dietitian. An RD can determine your individual protein needs, and provide accurate information on the amounts of protein and carbohydrate in foods. It should also be discussed with one's physician first. Some people find it so successful that they may need less levodopa, and your physician needs to work closely with you to determine the correct amount. Otherwise, you might find yourself overmedicated.

Other protein-related information. Meat, poultry, fish, milk, cheese, and eggs are all very high in protein. For many people, milk in particular blocks levodopa, to a greater extent than other protein-rich foods. To get better results from your Sinemet, use high-protein foods moderately, along with large helpings of fruits, vegetables, and grains. This means that at a meal you should eat a small portion (3-4 ounces) of meat, poultry, fish, cheese, or eggs, accompanied by fruit, vegetables, and bread, cereal, pasta, or other grains.

If milk is a problem for you, a good substitute is a “milk alternative” such as soy or rice milk. Be sure to choose the kinds that are fortified with calcium and vitamin D. Westsoy soy beverage has a fortified version. *Rice Dream* also carries a fortified version. You can get these products at larger grocery stores or at health food stores. See Chapter 9: Shopping List.

Carnation Instant Breakfast is inexpensive, and an Instant Breakfast Shake works well for most people, as long as it's made using soy or rice milk, and some fruit. However, it contains a small amount of dried milk, and those who are very sensitive to milk protein may not be able to use Instant Breakfast.

Plant protein is a good choice for part of your protein needs. Plant protein (dried beans, nuts, and seeds) contains a high ratio of carbohydrates to protein, whereas meat, fish, and poultry contain no carbohydrate. It's a good idea to eat several servings of cooked dried beans, peas, or lentils each week. Legumes have more fiber than any other food. Fiber helps with constipation and is heart-protective as well. Good choices are bean soup, refried beans, three-bean salad, and patties made from soy protein, like Morningstar Farms "Better'n Burgers" or Boca Burgers. You can find these and others in the freezer case at the grocery stores.



CHAPTER 3

Constipation

What is constipation and why does it occur so frequently with Parkinson's?

Constipation is defined as having fewer than three bowel movements per week. It occurs among many people with PD. Possible reasons include:

- 1) PD may cause some degeneration of the nerves of the GI tract. These nerves control “peristalsis” – the rhythmic movement of the GI tract, including the colon. When they are affected, peristalsis slows down. Slowed peristalsis of the colon means that the stool moves very slowly, becoming dry and hard
- 2) Medications used to treat PD (levodopa, dopamine agonists, selegiline, amantadine, anticholinergics, and others) can also cause constipation, again by affecting peristalsis.
- 3) People with PD often have a craving for sweets, which contribute to constipation by replacing the high-fiber foods that help to soften the stool and speed peristalsis.
- 4) Very few people drink enough fluids, which are needed to help keep the stool soft and bulky.

Why is constipation a cause for concern? Isn't it mainly just a nuisance?

At first, constipation may seem more of a nuisance than a real concern. However, there are several concerns, all of which have occurred in some people with PD.

- A person who is frequently constipated, over a long period of time, may develop hemorrhoids, a condition in which part of the tissues lining the anus slip outside, becoming enlarged and painful.

- Another concern is the possibility of *bowel impaction*, also known as *fecal impaction* — a condition where dry, hard feces accumulate in the colon and cannot be passed. Sometimes watery feces may pass around the impaction, as diarrhea, leading the person to believe s/he is not constipated. Bowel impaction can be very painful, and may require hospitalization. In extreme cases, surgery may be necessary.
- Still another consideration is that chronic constipation can raise the risk for colorectal cancer.

If constipation is caused by medications or by PD, how can it be controlled?

It's important to get enough fiber and fluids each day. Besides helping to prevent constipation, fiber can help lower blood pressure and cholesterol, prevent many chronic diseases, and often aids people with diabetes in controlling their blood sugar. Fluids, especially water, work hand-in-hand with fiber to keep the stool bulky.

What does fiber do?

Fiber, along with water, keeps our bowels working smoothly. Insoluble fiber works like a partner with water. Each bit of fiber soaks up water like a little sponge and swells up to many times its size. All these little water-soaked sponges add bulk to the stool, making it soft and easy to pass. They also exercise the muscles of the intestine, so they stay strong and healthy. More frequent bowel movements are often the result. This not only helps prevent constipation, it can also prevent or ease hemorrhoids. These occur when we strain to pass the stool. Fiber may also lower the risk of colon and rectal cancers.

Why can't I just use laxatives?

Many people prefer laxatives, which are powerful, but work in a different way. Laxatives stimulate the nerve endings of the colon, causing rapid removal of bowel contents. Over time, stimulant laxatives damage the lining of the colon, causing even greater difficulty with constipation.

What sources of fiber are best?

Fiber is found only in plant foods. Foods highest in insoluble fiber are whole grains, cooked dried beans, and fruits and vegetables with edible skins. Wheat bran is an excellent source of insoluble fiber. People who experience constipation should aim for 25 to 35 grams of fiber daily.

If you're not used to eating whole-grain foods, or apples and potatoes with the skin, it's best to increase the fiber content gradually. Bloating and gas can occur as the system tries to get used to the unusual load of fiber. Products like Beano have helped many people enjoy a fiber-rich diet. (See Appendix C.) If it's difficult for you to get enough fiber daily, consider using a product such as Unifiber, which can be added to foods or liquids, and even tube feedings. (See Appendix C.)

What about fluids?

Fluids are just as influential as fiber -- so much that an entire chapter is devoted to adequate hydration. Without fluid, fiber particles remain dry and harden, actually making constipation worse. Four to eight glasses of water per day, plus juices, milk, and other beverages are necessary.

What if fiber and fluids aren't sufficient to manage constipation?

- Diet should be your first treatment for constipation. However, sometimes peristalsis (muscle action in the large intestine) is slowed enough in Parkinson's disease that other therapies may be indicated. If you get plenty of fiber and fluids, yet still have fewer than three bowel movements per week, it may be necessary to take further steps.
- A remedy used in some hospitals is called the Prune Juice Cocktail.

Mix together:

1/2 cup applesauce

2 tablespoons wheat bran ("miller's bran")

4-6 oz prune juice

Store in refrigerator. Take a tablespoonful per day at first, gradually increasing until you find the amount that works best. Most people find this mixture quite palatable.

- Some patients report that a serving of prunes or prune juice including pulp 2-3 times per week is beneficial.
- It may be helpful to combine these two suggestions – have a daily spoonful or two of Prune Juice Cocktail, and 2-4 times per week, have a serving of cooked prunes.
- Ask your doctor about a fiber supplement, such as Metamucil, Citrucel, or Unifiber (see Appendix C). Metamucil and Citrucel can be stirred into liquids, and are found in most drug stores and grocery stores. Unifiber can be mixed with liquids or stirred into thicker foods, like mayonnaise, apple sauce, cooked cereals, and other foods; and if needed, can also be used in tube feedings. Your pharmacist can order Unifiber if not in stock or phone Niche Pharmaceuticals, Inc., Roanoke, Texas 76262, 1-800-677-0355.
- Manual “belly massage” from the bottom of the ribcage to the top of the pubic bone, performed 2-3 times daily, sends mechanical signals to the bowel to “keep things moving.”
- Train yourself to “honor the urge” to have a bowel movement. It may not always occur first thing in the morning or only at home! Likewise, be aware that the natural position for evacuating the bowel is squatting. Raised toilet seat devices may aid mobility, but are not ideal for bowel function. Try hiking your feet up on a small bench while sitting on the toilet.
- Ask your physician about using an over-the-counter stool softener such as Colace or Pericolace. If bowel motility is good but stool is dry and hard to pass, some health practitioners also advise occasional use of infant-sized glycerin suppositories to soften stool in the lower colon and reduce straining.

If you've tried all these solutions and still have a problem with constipation, you may need to consult your physician to see if prescription medications or referral to a specialist is indicated.

CHAPTER 4

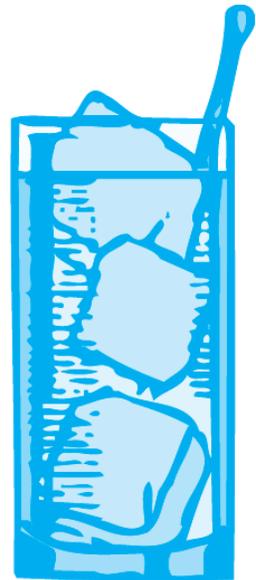
PD and Water Needs

Not everyone realizes that water is considered a nutrient. But in reality, it's quite possibly the most important nutrient of all. Yet, water is so cheap, so plentiful, and so easy to get, that we may take it for granted. We forget all the special things about water that no other drink can match.

Water dissolves the vitamins and minerals we need. Then blood, which is mostly water, carries them throughout the body. Water also helps lubricate our joints, and acts as a shock absorber inside the eyes and spinal cord. And, when the digestive system changes the food into fuel for the body, a lot of toxins and wastes are produced. Water is the force that carries these wastes out of the body in the breath, the urine, and the fecal matter. Truly, water is a miraculous substance.

Are fluids more important if you have Parkinson's? Yes, because those with PD are more likely to have constipation. Yet, with PD, there are so many things to think about that I believe the need for fluids often can be forgotten. However, fluids can be one of the most important aspects of dealing with PD.

How does water help constipation? The job of the large intestine, or colon, is to maintain enough water in the stool to keep it soft. But a hard stool is not life-threatening, so the colon has a low priority on water. When there's not enough water to go around, the colon removes some water from the stool and gives it to other organs – the brain, the kidneys, the bloodstream. The stool becomes dry, hard, and difficult to pass, resulting in constipation. Although constipation has many possible causes, if you don't drink enough water, constipation is a pretty sure bet.



But if you're not used to drinking water, start gradually adding a half-glass a day, and work up to 6 to 8 glasses. Your system may take some time to adjust. You could find that you retain water at first, but gradually your body will release the extra fluids and stay at a well-hydrated level.

Urinary tract infections --Another reason to drink plenty of fluids

Bladder and urinary tract infections are common in older adults and people with PD. Why? The thirst sensation is blunted as we age; therefore, we don't feel thirsty, even when we need fluids. Older adults are frequently in a state of mild and prolonged dehydration. This allows bacteria to grow and thrive in the bladder and urinary tract, causing infection.

A large glass of cranberry juice daily, along with at least four (preferably eight) glasses of water, plus any juices or other beverages usually consumed, is a good idea. Cranberry juice can help prevent infections in many cases, and can also help cure them, along with medications. Cranberries contain a substance that makes it difficult for bacteria to adhere to the walls of the bladder and urinary tract. The bacteria are then flushed out by the flow of urine.

Dry mouth, dry eyes, thirst – more reasons why we need fluids

Some people report that they often feel thirsty and sometimes have dry mouth, thick or sticky saliva, and dry eyes. This may be due to anti-Parkinson medications; the anti-cholinergic drugs such as Artane or Cogentin used to treat tremor are particularly known to cause such symptoms. Dry mouth may also be caused by difficulty swallowing, sleeping with the mouth open, or mouth breathing while awake. Be sure you're drinking plenty of fluids to counteract dry mouth.

Why is dry mouth a problem? Without saliva, bacteria can breed along the gums and cause decay and loss of teeth. Tooth loss may result in the need for dentures, which often don't fit well or work as well as natural teeth. This sometimes means that food is poorly digested. Dentures can also cause painful sores on the gums, if they don't fit well.

More on oral health

Other problems that affect dental health may include difficulty brushing, flossing and/or rinsing the mouth due to rigidity of the tongue, jaw and facial muscles. People with PD should discuss good oral care with their dentists. Provide a list of all the medications you use. Your dentist can recommend an artificial lubricant to help keep the mouth moist, if necessary. Also ask whether you need fluoride treatments or rinses.

If you are drinking six to eight glasses of water daily, plus juices and other beverages, yet still feel that your mouth is dry, try sipping water frequently and swishing it around your mouth to keep it moist. You should also report dry mouth to your dentist, who may suggest a fluoride rinse or artificial saliva, or even sugarless chewing gum.

Dry eyes

The automatic blink reflex is diminished in Parkinson's disease, causing less frequent blinking. This often results in tired, dry, itchy eyes even in a person who drinks plenty of water. Using artificial tears 2-3 times daily, available over-the-counter in pharmacies, is often recommended. Check with your doctor or optometrist to see if this solution might be helpful to relieve dry eyes.

Excessive thirst / no thirst

Feeling very thirsty can be a sign of acute dehydration. Chronic dehydration, on the other hand, doesn't always cause a feeling of thirst, yet causes many hospitalizations and may even result in death. Chronic mild dehydration, therefore, can be even more dangerous, because it goes unrecognized until it's too late. Unfortunately, many PD medications can raise the risk for dehydration, both chronic and acute.

Note: The thirst mechanism slows down with age. Unlike the hunger signal that tells us our body needs fuel, thirst awareness may not activate until we're already dehydrated. Also, older adults are more likely to take medications that change the amounts of sweat and urine produced, including drugs for respiratory conditions, urinary incontinence, diuretics, and PD.

Unless your doctor has ordered a fluid restriction, the best bet is to drink plenty of plain water, a minimum of 4-8 glasses per day. If you drink caffeine-containing drinks or alcoholic beverages, be sure to drink extra water.

People with PD have many concerns -- medications and their effects, timing of meals and levodopa, job responsibilities, family concerns, and much more. Sometimes the most basic need of all can be forgotten: the body's need for water.

Signs of dehydration

- Urinary tract infections
- Low back pain
- Mental confusion
- Dizziness
- Fatigue
- Dry tongue, longitudinal furrows in the tongue
- Dry mouth, cracked lips
- Sunken eyes
- Dark urine, infrequent need to urinate
- Difficulty swallowing liquids
- Difficulty speaking
- Upper body weakness
- Weight loss

If you experience dry mouth, dry eyes, or excessive thirst, write down how much water you drink daily, and check to see if you're drinking enough. If not, try adding half a glass per day until you reach the recommended level.

Water Log

Date: _____	Ounces of water consumed
Monday _____	Ounces H2O _____
Tuesday _____	Ounces H2O _____
Wednesday _____	Ounces H2O _____
Thursday _____	Ounces H2O _____
Friday _____	Ounces H2O _____
Saturday _____	Ounces H2O _____
Sunday _____	Ounces H2O _____

CHAPTER 5

Bone Health

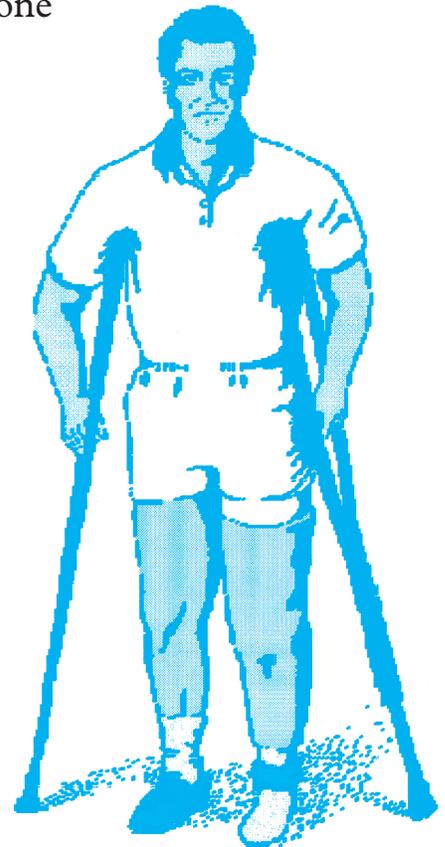
Osteoporosis is serious. It can cause fractures of the hip, spine, or wrist, and affects many women over age 60. However, though it's not as widely known, *men* – especially men with PD – are also at risk for osteoporosis and fractures. Studies have shown that both men and women with Parkinson's disease are likely to have lower bone mineral density, and greater incidence of osteoporosis, falls and bone fractures. Recovery from hip fracture takes longer with PD, and many people require long-term care before returning to their own home.

What is osteoporosis?

Osteoporosis is a disease that causes weakened bones. Calcium is removed from bones, leaving tiny holes. The early stage of such bone thinning is called osteopenia; when it progresses too far, it is called osteoporosis, and the risk for fracture is greatly increased.

What are the common risk factors for osteoporosis?

- Age. Bone loss increases with age.
- Postmenopausal estrogen loss in women
- Heredity and race: white and Asian women are at greatest risk.
- Long-term use of medications, such as the steroids used to treat asthma and arthritis; some cancer treatments; anticonvulsants; and antacids that contain aluminum
- Diseases that affect hormone levels, such as diabetes, kidney disease, and hyperthyroidism.
- Smoking.
- Excessive alcohol use.



- Low calcium intake.
- Too little physical activity.

An ounce of prevention is worth a pound of cure

Strong, dense bones can withstand the impact of a sudden fall, while weak, brittle bones will fracture. Men and women with PD can do a number of things to prevent osteoporosis. Although we can't do anything about age and heredity, there are other risk factors that we can control.

- Avoid unplanned weight loss – stay at a healthy weight. Losing too much weight raises the risk for bone fractures. Unplanned weight loss is accompanied by loss of bone mass as well as muscle and fat. Let your doctor or registered dietitian help determine the best weight for you, and maintain that weight.
- Talk to your doctor:
 - If you are a man or woman over age 50
 - If you are a postmenopausal woman
 - If you have a family history of osteoporosis
 - If you use medications that increase the risk for osteoporosis
 - If you believe you have low levels of testosterone (men)
 - If you have diabetes, kidney disease, or hyperthyroidism.

Change any unhealthy habits that cause bone thinning, like smoking, excessive alcohol use, and inactivity.

Get enough calcium, magnesium, and vitamins D and K.

Calcium — the bone mineral

The latest recommendation for adults age 50 and older is 1200 mg calcium per day. That amount can be found in four glasses of fortified milk or four to six ounces of cheese. But, since these foods are high in protein, they may not be helpful for those using levodopa. In fact, some people have found that dairy foods are more apt than other protein foods to inhibit levodopa absorption.

Getting enough calcium can be difficult when you have PD. Here are some recommendations that will help to meet calcium requirements.

- Calcium-fortified orange juice
- Calcium-fortified rice- and soy- milk alternatives for use on cereal, in smoothies, and in many cooked dishes
- Breakfast cereals and other foods fortified with calcium

It may also be necessary to use a calcium supplement. Calcium carbonate is the richest source of calcium, but some people cannot tolerate it. Calcium citrate is often a better choice. Chewable calcium tablets are better absorbed, because they are already broken down when they reach the stomach.

Vitamin D -- for calcium absorption.

Without adequate amounts of vitamin D, calcium cannot be absorbed by the body. If you live in a sunny area, vitamin D is easy to get through about one hour per week outdoors in the sunshine with the face, hands, and arms exposed. Because vitamin D is stored, our bodies can conserve enough D during the summer to last us through the winter.

However, if you live in northern areas or if you mostly stay indoors, you may not get enough vitamin D from sunlight. The current recommendation for vitamin D is 400 IUs daily (ten mcg) for people age fifty and older; and 600 IUs daily (15 mcg) for those over age 70.

Food Sources of Vitamin D:

Fortified foods, such as milk and milk substitutes, milk products, margarine, and cereals

Fatty fish, such as salmon, and fish liver oils

Liver

Eggs

If you think you're not getting enough vitamin D, check with your doctor or registered dietitian about a vitamin D supplement. Be careful not to take too much, since it's stored in the tissues and can be toxic in large amounts.

Magnesium is just as important as calcium. It helps rebuild and strengthen bone. Magnesium also has some effect as a muscle relaxant, so may be beneficial to people with PD who experience muscle rigidity as a primary symptom.

Broccoli and other dark green vegetables, dried beans and peas, and whole grains are all rich in bone-building magnesium. For adults, the RDA is 420 mg per day for men, 320 mg per day for women. Magnesium and calcium are often combined in over-the-counter nutritional supplements.

Don't forget vitamin K. This nutrient is also important, however, it is not as difficult to get from foods as calcium and vitamin D. The adult requirement for vitamin K is 120 mcg for men and 90 mcg for women. Dark green leafy vegetables such as collards, spinach, and chard; Brussels sprouts, broccoli, cabbage, and lettuce, all provide generous amounts of vitamin K.

CHAPTER 6

Unintended Weight Loss

All too often, people with PD lose weight, sometimes a critical amount of weight, unintentionally. There are many possible reasons for this.

- Depression can cause lack of appetite and desire to eat.
- Chewing or swallowing difficulties may make it hard to eat at a normal rate; it may take hours to finish a meal
- Some have difficulty manipulating a fork and knife
- Tremor and dyskinesia burn up many extra calories
- In other instances, people with PD report their appetites are good, they enjoy eating, and yet still mysteriously lose weight.

Often this weight loss is gradual, taking place over a period of several years. In other cases, weight loss can be sudden, occurring over a period of months or even weeks.

Weight loss --why is it a problem?

Unplanned weight loss should never be taken lightly. Studies report that the loss of just ten percent of a person's maximum lifetime weight within the past ten years raises the risk for illness, bone fracture, and even death.

When we lose weight, precious muscle mass is depleted, too. Muscle wasting makes it difficult to walk, maintain proper balance, and perform the usual activities of daily living. Furthermore, the body becomes depleted of nutrients, like vitamins and minerals. This depletion can lead to behavior change, altered mental function, depressed immune system, weakened bones, and other undesirable conditions.

Besides these concerns, we need regular meals to maintain our energy. People with PD often experience fatigue due to the disease or medications used to treat PD; lack of glucose can make this fatigue even worse. Food supplies a steady stream of blood glucose, which our body's cells use for nourishment, energy, and work. Without this glucose, we may feel tired, listless, apathetic.

If you have lost weight without meaning to.....

If you or someone you know has lost weight within the past few weeks, you must notify your physician and ask for a referral to a registered dietitian. Why? Your medications, laboratory reports, food preferences, and any diagnoses must be taken into consideration when planning a weight gain program. A dietitian can help you solve these problems and design a safe, personal eating plan for regaining weight.

What if I don't feel like eating?

Medications can cause a loss of appetite. Also, people with PD often lose the sense of smell, and this affects the ability to taste, and sometimes affects appetite as well.

When your appetite is poor, a big plate of food can seem discouraging. Don't try to force yourself to eat large meals. You'll need to eat a bit more than you have been, but not all at one time. Instead, plan for three small meals and three or more nutritious snacks each day. Meals should range from 300 to 600 calories each, and snacks from 50 to 300 calories, totaling enough calories to prevent weight loss. If weight loss has already occurred, calories should be adequate to allow you to regain weight.

Aim for a gradual weight gain of about one or two pounds per month. A number of my clients who have experienced gradual weight loss over as much as ten years, have regained weight in this way.

What if I can't finish meals on time?

Several conditions may make it hard to finish a meal. Sometimes bradykinesia (slowed movement) makes it difficult to handle utensils, or cut meat.

It may help to choose softer foods, like meatloaf, soups and stews, where the meat has been ground or cooked to tenderness, and doesn't have to be cut. Avoid raw vegetables and lettuce salads – these are difficult to spear on a fork and convey to the mouth. Cooked vegetables, vegetable juices, and vegetable soups may be better choices. Pureed soups can be sipped from a mug, avoiding the need for a spoon. This can also help if chewing becomes difficult.

Sometimes it's hard for me to swallow, or I feel like I might choke.

If it's hard to swallow, or if choking occurs, your physician should order a visit to a speech pathologist. This is very important because there could be a danger of inhaling food. Food particles, liquids, or even saliva in the lungs can cause a form of pneumonia called "aspiration pneumonia." Aspiration pneumonia is a very frequent cause of hospitalization among people with PD. The speech pathologist can perform a swallowing evaluation to determine whether you are at risk for aspiration pneumonia, and if so can show you safe swallowing techniques. You may be advised to eat soft, well-cooked foods or to avoid such foods as nut butters and raw vegetables until danger of choking is past.

When depression causes weight loss

Lack of appetite may be due to depression, a condition of sadness or hopelessness. This is often a temporary condition, but if it persists, your doctor may refer you to a counselor, or prescribe a medication to help. It's especially important to eat at this time, because lack of nutrients can make depression much worse.

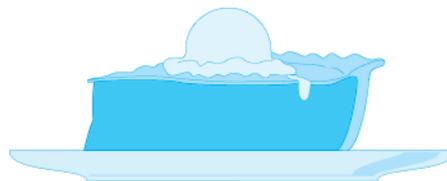
Follow the guidelines under "What if I don't feel like eating?" Aim for small meals with frequent snacks. Meals and snacks should be as nutritious

as possible, in order to provide all the vitamins and minerals needed to help overcome depression. A multivitamin-mineral pill is a good idea, too; ask your physician or pharmacist to recommend one.

Keep on hand the foods you like best. It's easier to eat foods you like than those you don't much care about.

Keep small snacks sitting out, where you can reach them easily. If you take levodopa, low-protein snacks are especially important. A dish of ice cream, a cup of hot chocolate (make with fortified soy or rice milk substitute if necessary), a few fig cookies, may be appealing. It's better to eat sweets than not to eat at all!

Attractive, colorful meals are usually more appealing, so make the most of garnishes, textures, and flavors. A bright, cheerful setting, and soft music, may help, too.



CHAPTER 7

Recipes and Menus

This chapter will help you get an idea of some eating plans that are helpful for various concerns in PD. Ideally, however, you should ask your physician for a referral to a registered dietitian, who can assess your individual needs and give the personal guidance you require. This is especially important as PD advances, and health needs change.

Your health needs.

As previously discussed, people with PD need to be extra careful to get a diet rich in fiber, calcium, magnesium, and antioxidants. Although multivitamin and mineral supplement are usually important, too, it's still best to rely first on food. The balance of nutrients in foods cannot be equaled by any supplement.

A word about sugar. Many people with PD find they have cravings for sweet foods. It's tempting to use sweets often, especially since they won't interfere with levodopa absorption. However, sweets can greatly contribute to constipation, elevated blood sugar, high triglycerides, and other disease conditions. Enjoy sweets in moderation, not as a replacement for the variety of grains, vegetables and fruits needed for a balanced menu.

Following are some sample menus, and recipes, that will give you an idea of the ideal eating plan for some of the common concerns in PD:

- constipation
- bone thinning
- unplanned weight loss
- protein-adjusted

Each menu contains about 2000 - 2200 calories. This may be too much for some people, too little for others. You will need to adjust the amounts and serving sizes for your own particular needs, preferably with the help of a registered dietitian.

Eating to help manage constipation

As we saw in chapters 3 and 4, both fiber and fluids are necessary to combat constipation. If you have fewer than three bowel movements per week, you should aim for at least 25 and up to 40 grams of fiber per day, preferably from foods. Also, drink 48 to 64 ounces of fluids (6 to 8 eight-ounce glasses; 1 to 1 litres) daily; at least half of these fluids should be plain water.

Here is a one-day menu that you can use as a guideline to help you manage constipation.

High-Fiber & Fluid: One-Day Menu

This one-day menu contains 6 glasses of plain water, along with juices, milk, coffee or tea, and 36 grams of dietary fiber. The prunes contain a natural laxative as well as fiber and valuable antioxidants. Soy or rice milk alternatives may be used in place of cow's milk (Ch. 9).

8 ounces water upon arising (may use this to take medications)

Morning:

6 ounces grape juice
1/2 cup Grape-Nuts cereal
8 ounces skim or 1% milk
1 ounce stewed prunes (about 8 small prunes)
Coffee or tea if desired

Midmorning: 8 ounces water
One hour before midday meal: 8 ounces water

Midday:

Tuna salad sandwich on two slices whole-wheat bread
Spicy Black-Eye Pea Salad (see Recipes)
1 fresh pear
8 ounces low-sodium tomato juice
2 chocolate chip cookies

Midafternoon: 8 ounces water
One hour before evening meal: 8 ounces water

Evening:

Broiled ground beef patty
1 cup buttered broccoli
1/2 cup brown rice
1 whole-wheat dinner roll with butter
Coffee or tea if desired
1/2 cup ice cream

Two hours before bedtime: 8 ounces water

Nutrition information (approximate): 2204 calories, 88 g protein, 304 g carbohydrate, 81 g fat, 26 g sat. fat, 164 mg cholesterol, 36 g fiber.

Bone Health: One-Day Menu

Use of calcium-fortified orange juice and vitamin D-fortified yogurt helps raise the levels of these nutrients. However, the recommended amount of vitamin D for those up to age 50 is 5 mcg (200 IU per day); age 50 - 70 is 10 mcg (400 IU); age 70+ is 15 mcg (600 IU). Food sources of vitamin D include fatty fish, fish oil, liver, and eggs. It is very difficult to get sufficient dietary vitamin D without use of fortified foods or supplements. A daily multivitamin may be a good idea.

Morning:

4 ounces calcium-fortified orange juice
1 cup plain vit.D-fortified yogurt with
1 sliced banana, 2 tablespoons raw walnuts,
1 tablespoon honey
Coffee or tea

Snack:

Banana-Cherry Frostie (See Recipes)

Midday:

4 ounces calcium-fortified orange juice
Potato, Kale, and Chickpea Soup (see Recipes)
2 rye crackers
1 ounce cheese

Evening:

Linguini with Red Clam Sauce (see Recipes)
Garlic bread
1/2 cup Brussels sprouts
Coffee or tea

Nutrition information (approximate): 2025 calories, 86 g protein, 315 g carbohydrate, 49 g fat, 14 g sat. fat, 98 mg cholesterol, 33 g fiber. Bone-building nutrients: 1441 mg calcium , 350 mg magnesium, 1526 phosphorus, .9 mcg vit. D, 340 mcg vit. K

Unplanned Weight Loss: One-Day Menu

Most people can regain lost weight by adding about 100-400 calories daily to their current eating plan. This provides for a safe, gradual weight gain, without feeling “stuffed” all the time. Fats might seem like a good choice because they are calorie-dense; but they also make you feel full for a long time. It's best to use them in moderation, so you'll be able to eat snacks in between meals.

Although it's better to eat junk food than not to eat at all, it is far better to choose nourishing, nutrient-rich snacks and meals. If you use levodopa, choose low-protein snacks between meals, so that they will not block levodopa absorption. Here are some examples.

Morning:

One egg, cooked as you like it
1 slice whole-grain toast, with
butter and jelly
4 ounces calcium-fortified orange
juice
Coffee or tea

Mid-morning snack:

Blackberry Peach Cooler
(See Recipes)

Late-morning snack:

Toasted bagel with butter
4 ounces calcium-fortified orange
juice

Midday:

1 cup baked beans
1/2 cup carrot sticks
8 ounces 1% milk (use a soy or rice
milk substitute if desired, Ch. 9)
4 whole-wheat crackers
1 ounce cheese

Mid-afternoon snack:

1 piece of fruit, such as a banana,
apple, or 1/2 cup of grapes, berries,
or cherries

Late-afternoon snack:

1/2 cup ice cream

Evening:

Chicken Chili (See Recipes)
1 slice garlic bread
1/4 cup coleslaw
4 ounces grape juice

Bedtime snack:

Banana or other fruit

Nutrition information (approximate): 2223 calories, 359 g carbohydrates, 78 g protein, 61g fat, 26 g saturated fat, 344 mg cholesterol, 2277 mg sodium, 40 g fiber.

Protein Adjustment

People with PD need at least much protein as other people do, and often somewhat more. If you are not using levodopa, protein isn't a problem; also, if you take levodopa well before meals, it should be absorbed before protein in the meal can reach the bloodstream.

However, if you take levodopa 30 - 60 minutes before meals or protein-rich snacks, and still find that levodopa absorption is blocked, or if you are experiencing severe "on-off" fluctuations (motor fluctuations), you may find that adjusting protein intake is helpful.

This isn't necessarily a problem. The average day's meals usually contain far more protein than required, so it's possible to cut back on the amount consumed and still gain all the protein you need for good health.

It is very important, however, to make sure that you get sufficient protein to meet your needs. Ask your physician to refer you to a registered dietitian, who can assess your protein needs and help you with menu planning.

If you are otherwise healthy, you need about 1/2 gram of protein per pound of body weight per day. For example, someone who weights 150 pounds needs about 75 grams of protein daily.

Protein is found in most foods, except for fruits. Here are some common foods with the approximate amount of protein in each, to help you with menu planning.

Amounts of protein in common foods

Food	Grams Protein (approximate)
Bread: 1 slice	3 grams
Meat, poultry, fish: 1 ounce	7 grams
Vegetables: 1/2 cup	2 grams
Fruit: 1/2 cup	0 grams
Milk: 8 ounces	8 grams
Yogurt: 8 ounces	9 grams
Egg: one large	6 grams
Cheese: 1 ounce	7 grams
Cooked dried beans, peas, lentils: 1 cup	20 grams
Peanut butter: 1 tablespoon	4 grams
Nuts: 4 tablespoons (1 ounce)	4 grams

Protein-Adjusted One Day Menu

This example is designed for a 150-pound (68 kilogram) person. At 1/2 gram of protein per pound of body weight per day (or about 1 gram per kilogram per day), this person requires about 75 grams of protein (if using kilograms, the figure will be about 68 grams per day). It's important to divide the protein about equally among three meals daily (don't worry about every single gram, though), so that you're not taking in a very large amount at any one meal.

Morning:

(24 grams protein)

2 eggs, cooked as you like
2 slices bacon

8 ounces calcium-fortified orange juice
2 slices whole-wheat toast with butter
2 tablespoons jam, jelly, or honey
Coffee or tea

Midmorning snack:

(0 grams protein)

8 ounces cranberry juice

Midday:

(24 grams protein)

2 cups navy bean soup
2 large rye crackers

4 ounces 1% milk (can use soy or rice
milk substitute if desired, Ch.9)
1/2 cup cooked buttered spinach
2 chocolate chip cookies
Coffee or tea

Midafternoon snack:

(0 grams protein)

1 cup sliced fruit

Evening:

(27 grams protein)

3 ounces broiled salmon
1/2 cup cooked yellow squash
1/2 tomato, sliced
1 pear
1 cup sherbet
Coffee or tea

Nutrition information (approximate): 2108 calories, 328 g carbohydrates, 75 g protein, 61 g fat, 24g saturated fat, 555 mg cholesterol, 2243 mg sodium, 27 g fiber.

Following are some meal menus that may be helpful. You can substitute these for some of those listed in the one-day meal plans, and also use them as guidelines for making your own personalized meal plans.

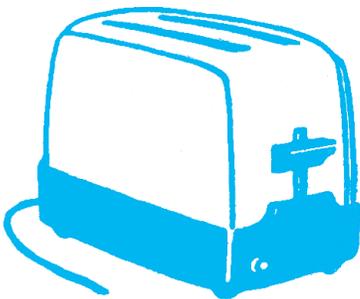
Foods have been chosen because they are nutrient-dense, or else because they appeal to a craving for sweets, in which case they are combined with other nutrient-dense foods.

In these recipes, butter can be replaced with margarine. Jelly can be replaced with jam, fruit butter, or honey. Milk is 1% or skim milk. If you find that cow's milk blocks levodopa absorption, milk can be replaced with fortified soy or rice milk alternative; this will lower the protein content by about 5 grams per 8 ounce serving.

BREAKFAST MENUS

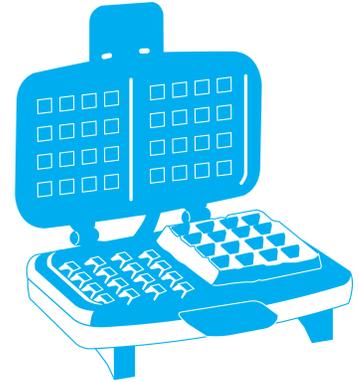
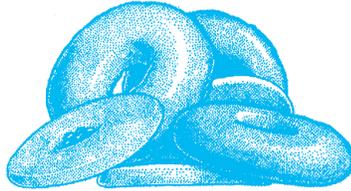
1 cup bran cereal flakes
1 cup milk
8 ounces calcium-fortified orange juice
1 toasted whole-wheat English muffin, with butter and jelly

1 1/2 cups oatmeal cooked with 2 tablespoons raisins
1/2 cup milk
8 ounces calcium-fortified orange juice
1 whole-wheat bagel, toasted, with butter or cream cheese



2 slices raisin toast with butter
2 tablespoons jelly
1 cup raisin bran
1 cup milk
8 ounces calcium-fortified orange juice

2 frozen waffles, toasted
1/4 cup syrup
2 teaspoons butter or margarine
8 ounces milk
1 cup cut-up fruit salad



1/4 cup stewed prunes
1 slice French toast
1 teaspoon butter
2 tablespoons syrup
8 ounces calcium-fortified orange juice

Skillet Breakfast Solo (see Recipes)

MIDDAY AND EVENING MEAL MENUS

Chicken, turkey, or roast beef sandwich:

2 ounces cooked chicken, turkey, or roast beef
2 slices whole wheat bread

lettuce, mayonnaise, tomato, onion, mustard, as desired

1/2 cup cooked vegetable of your choice

8 ounces cranberry juice

1 apple

1/2 cup carrot sticks



1 cup spaghetti with 1/2 cup marinara sauce, 1 meatball

2 slices garlic bread

1 cup Brussels sprouts or broccoli with lemon juice and butter

8 ounces cranberry juice

2 sugar cookies

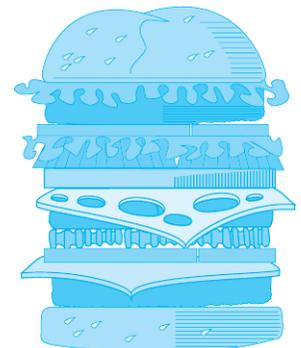
1 1/2 cups split pea or lentil soup
Small tossed salad with choice of dressing
8 ounces cranberry juice
1 ounce cheese
4 whole-grain crackers
1/2 cup melon chunks or other fruit



1 bean and cheese burrito
1 banana, apple, or other fruit
8 ounces grape juice

Tuna-macaroni salad: 2 ounces canned tuna, 1 cup cooked macaroni,
2 tablespoons light mayonnaise
1/2 cup carrot sticks
1/4 cantaloupe or 1/2 cup other fruit
8 oz calcium-fortified orange juice or milk

1 vegetable patty (Ch. 9)
1 hamburger bun
1/2 cup cooked kale, collards, or chard
1/2 cup applesauce
1/2 tomato, sliced
8 ounces milk



2-3 ounces baked ham
1 cup boiled potatoes (6 ounces), 1 tablespoon sour cream
1/2 cup cooked buttered carrots
1/2 cup cooked kale, collards, or chard
8 ounces low-sodium tomato juice
1 slice whole wheat bread with 1 teaspoon butter
1 slice fruit pie or fruit cobbler

- 2-4 ounce slice of meatloaf
- 1/2 cup mashed potatoes
- 1/2 cup Brussels sprouts or broccoli with butter and lemon juice
- 1 piece cornbread with butter and jelly
- 8 ounces pure fruit juice of your choice
- 1 slice frosted cake

RESTAURANT BUFFET LUNCH OR DINNER

Buffets are a good way to choose a healthful meal. If you need to restrict protein, just keep meat, poultry, fish, egg and dairy portions small, and add plenty of fruits, vegetables, breads and grains. Here's an example:

Protein: choose a small serving of meatloaf, baked fish/chicken, or roast beef /ham.

(A 3-ounce serving is about the size of a deck of playing cards.)

Vegetable — 1 to 2 cups

Fruit salad — 1 to 2 cups

Whole-grain bread or roll, butter or margarine

Fruit juice — 8 oz

Dessert — moderate serving



BETWEEN-MEAL SNACKS

Snacks between meals are an excellent choice for several reasons:

- They help to control blood glucose. People with diabetes or hypoglycemia may benefit from smaller meal sizes, and use of snacks between meals. This keeps blood glucose from “spiking” (rising too quickly, then dropping too low).
- They can help you to regain weight. Three small meals, along with frequent snacks daily can add the extra calories needed to gain weight. It's more appealing to deal with small meals and snacks than to try to consume a large meal.
- Snacks can help prevent heartburn. Eating several small snacks instead of a single large meal can help prevent overfilling of the stomach, which may lead to heartburn. Caution: to prevent heartburn at night, eat the evening meal several hours before bedtime, and do not snack before bed.
- Snacks help fight fatigue: Eating a small amount of food every hour or two provides a constant supply of glucose in the bloodstream. The glucose is used for energy, and may help to lessen fatigue.

The snacks shown here are carefully chosen. They are “nutrient-dense,” meaning that they provide a great many nutrients, rather than just “empty calories.” They are also low in protein, so if you use levodopa, they are less likely to interfere with its absorption.

Fruit Smoothie — Instant Breakfast

8 ounces soy or rice milk substitute
1 banana or 1 cup other fruit
1 tablespoon Carnation Instant Breakfast

Place all ingredients in blender, blend well. Makes one serving.

NOTE: Carnation Instant Breakfast is an enriched powder which you add to milk or milk substitute to make a nutrient-dense beverage. Instant Breakfast contains a small amount of dry milk solids; persons who are sensitive to milk or milk protein may need to use the Ensure Fruit Smoothie.

Fruit Smoothie – Ensure

8 ounces Ensure
1 cup sliced strawberries, peaches, or other fruit (fresh, frozen, or canned)
2 tablespoon sugar

Place all in blender, blend till smooth. Makes 1 serving.

Egg and cranberry juice

1 hard-cooked egg or two deviled egg halves
8 oz cranberry juice

Peanut Butter and Juice

1 teaspoon peanut butter
1 whole-wheat cracker
6-8 ounces your favorite fruit or vegetable juice

CHAPTER 9

Shopping list

This chapter will help you locate foods and products useful in menu planning. Some are easily found in most grocery stores, though you might not be familiar with them. Other items may be more difficult to locate.

Larger grocery stores carry many specialty foods, and can usually order products they don't normally carry. Health food stores should also carry most of these products.

Calcium-fortified Orange Juice. Orange juice fortified with calcium provides a very good source of well-absorbed calcium. Ounce for ounce, it contains as much calcium as milk. Tropicana, Minute Maid, and many other producers make a calcium-fortified orange juice that comes in cartons in the refrigerated section at the grocery store. Several companies, including Minute Maid, also offer calcium-fortified orange juice, as a frozen concentrate, in the freezer section.



Milk Substitutes/Milk Alternatives. Cow's milk is high in protein -- eight grams per eight-ounce serving — and can be very troublesome for some people with PD. Protein blocks levodopa absorption. Some people find that milk protein interferes more than proteins from other foods, such as meat, poultry, fish, and plant proteins. Because milk is rich in calcium and fortified with vitamin D, it's one of our best sources for these nutrients. Avoiding cow's milk can make it difficult to get enough calcium and vitamin D in the daily menu.

However, there are low-protein milk substitutes you can try. These can be used on cereal, for cooking, and for fruit shakes and smoothies. Be sure the milk substitute you choose is fortified with calcium and vitamin D — not all varieties are fortified. I recommend:

Westsoy Soy Beverage. Be sure to get the fortified version. You can get Westsoy soy milk at larger grocery stores or health food stores. If your store doesn't carry it, they can order it for you from:

Westbrae Natural Foods
Carson CA 90746

Rice Dream is another milk substitute that many people enjoy. It comes in plain, vanilla, and chocolate flavors. Be sure to choose fortified versions. It's distributed by:

Imagine Foods, Inc.
350 Cambridge Avenue, Suite 350
Palo Alto CA 94306

Burgers. Meat is very high in protein. If you need to cut back on protein, there are many delicious substitutes. Experiment till you find one you like. I recommend those made with soy protein, because soy has unique protective phytochemicals not found in other foods. Examples: Morningstar Farms "Better'n Burgers" and Boca Burgers. Most large grocery stores carry these in the freezer case.

Canned Soups. For quick and convenient meals, you may want to keep several cans of soup on hand. Good choices are soups made with cooked dried beans, peas, and lentils, because these are higher in fiber than any other food. I recommend you choose soups that are lower in sodium and saturated fat. Some examples:

Campbell's Healthy Request
Healthy Choice
Progresso 99% Fat Free Lentil



Breakfast Cereals — High Fiber. To increase fiber in your daily menu, breakfast cereals are a good choice. Choose those that have at least five grams of fiber per serving. Some good choices:

Nabisco Shredded Wheat Spoon Size (5 g fiber per cup [49 g])

Nabisco Shredded Wheat 'N Bran (8 g fiber per 1 1/4 cups [59 g])

Post Grape-nuts (5 g fiber per _ cup [58 g])

Post Raisin Bran (8 g fiber per 1 cup [59 g])

General Mills Multi-Bran Chex (7 g fiber per 1 1/4 cups [58 g])

General Mills Total Raisin Bran (5 g fiber per 1 cup [55 g])

Note: General Mills Fiber One contains 13 g fiber per 1/2 cup serving. Aspartame is among the listed ingredients. Anecdotal evidence indicates some people with Parkinson's may experience undesirable side effects from use of Aspartame.

CHAPTER 10

Recipes

Banana-Cherry Frostie

Servings: 1

Flax seed is an excellent source of both soluble and insoluble fibers, as well as heart-healthy fatty acids. Cherries contain anthocyanins and bioflavonoids -- powerful antioxidants that may help prevent colon cancer, and reduce the inflammation and pain from arthritis and gout. You may use a milk substitute if desired (Ch. 9). Reprinted courtesy of the Cherry Marketing Institute.

- 1 teaspoon flax seed
- 1 very ripe banana, peeled
- 1 cup fresh or frozen unsweetened pitted tart cherries
- 1 cup skim milk

Put flax seed into blender and grind. Add banana, frozen cherries and milk and blend til smooth. Serve immediately. If too tart, add a tablespoon of honey.

Nutrition information per serving: 354 calories, 70 g carbohydrates, 13 g protein, 4 g fat, 1 g saturated fat, 4 mg cholesterol, 132 mg sodium, 9 g fiber.

Blackberry Peach Cooler

Servings: 4

You can be sure you're nourishing both body and mind when you serve this invigorating shake. Blackberries are a rich source of health-protecting nutrients. Reprinted courtesy of Oregon Raspberry & Blackberry Commission.

2 cups blackberries, fresh or frozen
1 12-ounce can peach nectar
2 teaspoons lemon juice
3 tablespoons sugar (3 to 4 tablespoons)
16 ounces crushed ice (approximate)
Sparkling mineral water (optional)

Crush/purée berries and strain through a fine sieve to yield approximately 1 cup purée. (If berries are frozen, partially thaw before crushing.) Combine purée with remaining ingredients, stir and pour into chilled glasses. Sparkling mineral water makes a nice addition and may be added to glasses if desired.

Nutrition information per serving: 135 calories, 34 g carbohydrates, 1 g protein, 0 g fat, 0 g saturated fat, 0 mg cholesterol, 8 mg sodium, 4 g fiber.

Skillet Breakfast Solo

This can easily be doubled or tripled, as needed.

Cooking spray, such as Pam
1/2 tsp butter or margarine
1/4 cup onion, diced 1"
1/4 cup green or red bell pepper, diced 1"
1 small potato (about 3 oz), baked and diced 1"
1/4 tsp Season-All seasoning (or your favorite)
1 egg, cooked as you prefer
1 slice whole-wheat toast with butter and jelly
8 ounces calcium-fortified orange juice

Spray skillet with cooking spray, heat to medium-high. Add butter, onion, and bell pepper. Stir and cook about 3 minutes. Add potato and sprinkle all with Season-All, cook, stirring occasionally, about 3 minutes, or till potatoes begin to brown. Meantime, cook the egg. Scoop vegetables out onto plate, place egg on top. Serve with toast and orange juice. Serves one.

Nutrition information (approximate): 488 calories, 84 g carbohydrates, 13 g protein, 13 g fat, 6 g saturated fat, 228 mg cholesterol, 367 mg sodium, 6 g fiber.

Spicy Black-Eye Pea Salad

Servings: 4

All dried legumes are a wonderful source of fiber, as well as important minerals. The avocado adds heart-protective fats.

- 1 (15.5 ounce) can black-eyed peas, drained and rinsed
- 1 cup chopped ripe tomato
- 1/2 cup chopped sweet onion
- 1/2 cup chopped cucumber
- 3 tablespoons red wine vinegar
- 3 tablespoons olive oil
- 1/4 teaspoon salt
- 1/4 teaspoon pepper
- 1/2 teaspoon dried oregano
- 1/2 teaspoon dried parsley
- 1/2 teaspoon dried basil
- 1/2 teaspoon crushed red pepper flakes (optional)
- 1 avocado, pit removed, peeled, and chopped

In a large bowl, mix black-eyed peas, tomatoes, sweet onion, and cucumber. In a small bowl, whisk together vinegar, oil, salt, pepper, oregano, parsley, basil, and red pepper flakes. Pour over bean mixture and stir to combine. Chill, or serve at room temperature. Stir in the avocado just before serving.

Nutrition information per serving: 287 calories, 25 g carbohydrates, 7 g protein, 171 g fat, 26 g saturated fat, 0 mg cholesterol, 457 mg sodium, 7 g fiber.

Chicken Chili

Servings: 6

Try chicken and bulghur instead of chicken and noodles for a change and see how it boosts the fiber! Use a food processor to ease the chopping and shredding.

- 8 ounces canned reduced-sodium tomato juice
- 1 cup bulghur (cracked wheat)
- 2 tablespoons peanut or olive oil
- 2 medium onions, chopped
- 4 garlic cloves, minced
- 3 celery stalks, diced 1/4"
- 3 carrots, shredded
- 1 (14 ounce) can reduced sodium Italian plum tomatoes, with juices
- 1 (15.5 ounce) can reduced sodium pinto beans
- 1 (12.5 ounce) can chunk chicken in water, drained
- 1 (4 ounce) can green chilies, chopped
- 1/3 cup chili powder, or to taste
- 2 teaspoons ground cumin
- 1 teaspoon dried oregano
- _ teaspoon black pepper
- 12 ounces water (can also use beer)

In small saucepan, heat tomato juice over medium heat to boiling. Remove from heat and add bulghur. Cover and let stand 10 minutes. Meantime, in large 5-6 quart pot, heat oil over medium heat. Add onion and garlic and cook 3-4 minutes or til soft. Add celery, carrot, and tomatoes with juice, mashing tomatoes with metal spoon. Cover and cook til vegetables are almost tender, about 20 minutes. Add pinto beans, bulghur, chicken, chilies, chili powder, cumin, oregano, pepper, and beer or water. Simmer, partly covered, 30 minutes, stirring occasionally to prevent sticking.

Nutrition information per serving: 404 calories, 54 g carbohydrates, 23 g protein, 10 g fat, 2 g saturated fat, 37 mg cholesterol, 415 mg sodium, 12 g fiber.

Potato, Kale, and Chickpea Soup

Servings: 4

You can substitute a 10-ounce package of frozen chopped kale if you wish. You can substitute red or white “boiling potatoes” also, but they may not brown as nicely. Leave the skins on, though – they add color and contrast, besides fiber and vitamins.

- 1 pound kale, stems cut out, washed, chopped 1"
- 2 tablespoons olive oil
- 1 1/2 pounds russet or Yukon Gold potatoes, unpeeled and diced 1/2"
- 1 onion, chopped
- 2 cloves garlic, minced
- 1/2 teaspoon turmeric
- 1 (19 ounce) can chickpeas, drained and rinsed
- 2 (15 ounce) cans low-sodium chicken broth

1. In a medium saucepan, bring a quart of water to a boil. Add the kale and cook for 3 minutes. Drain; set aside.
2. In a large pot, heat the oil over moderate heat. Add the potatoes and onion and sauté, stirring frequently, until the potatoes start to brown, about 5 minutes. Add the garlic and turmeric and cook, stirring, until fragrant, about 1 minute.
3. Add the cooked kale, chickpeas, and chicken broth. Bring to a simmer and cook until the potatoes are tender, about 15 minutes.

Nutrition information per serving: 485 calories, 84 g carbohydrates, 15 g protein, 11 g fat, 2 g saturated fat, 0 mg cholesterol, 470 mg sodium, 13 g fiber.

Linguini with Red Clam Sauce

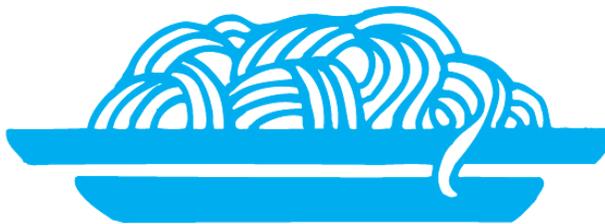
Servings: 6

Clams are an excellent source of high-quality protein, and many trace minerals. Tomato sauce contains lycopene, which may protect against prostate cancer.

- 1 tablespoon olive oil
- 2 teaspoons minced garlic
- 1 (30 ounce) jar marinara sauce
- 3 (6.5 ounce) cans chopped clams with juice drained off and reserved
- 16 ounces dry linguini, cooked according to package directions, drained
- 1/4 cup minced parsley

In large saucepan, over medium heat, warm the olive oil. Add garlic and saute till golden, about 1 minute. Add marinara sauce and reserved clam juice and bring to a simmer. Add clams and simmer 5 minutes. Place linguine in a serving bowl and top with sauce. Sprinkle with parsley.

Nutrition information per serving: 563 calories, 74 g carbohydrates, 35 g protein, 12 g fat, 2 g saturated fat, 60 mg cholesterol, 137 mg sodium, 5 g fiber.



APPENDIX A:

“Ask the Parkinson Dietitian” Kathrynne Holden, MS, RD

Do you have questions about nutrition for those with PD? The National Parkinson Foundation has provided an online forum, so that people with PD, their families and friends, support group leaders, and health professionals, can ask questions about nutrition as it relates to PD.

The forum is moderated by Kathrynne Holden, MS, RD (author of *Parkinson’s Disease: Nutrition Matters*), a registered dietitian who specializes in PD.

You will receive a daily digest of all questions that have been posted the day before. You can also e-mail your own questions, read archived questions and responses, or perform searches of specific topics that have been discussed in the past. A few of the topics discussed include:

- kava kava
- coral calcium
- osteoporosis
- vitamin E
- St. John's wort
- green tea
- bloating
- appetite loss
- kidney stones
- fava beans
- vitamin B6
- appetite loss
- quinine
- tube feeding
- gout
- diabetes

To join the forum:

Point your browser to the NPF website: <http://www.parkinson.org/>

On the Home Page, locate “Ask the Parkinson Dietitian”

Click on that link

Follow directions to sign up.

APPENDIX B:

Internet Resources

American Dietetic Association

Find a registered dietitian in your area; check the Daily Nutrition Tip and special Features.

<http://www.eatright.org/>

Nutrition Analysis Tool. Allows the reader to enter a food or list of foods for nutrient analysis; also lets you calculate approximately how much energy you burn during the day.

<http://www.nat.uiuc.edu/>

Nutrition Navigator. A rating guide to nutrition websites, by one of the most respected schools of nutrition in the world.

<http://navigator.tufts.edu/>

Parkinson's Disease: Nutrition You Can Live With! This website is focused on the special nutrition needs of people with Parkinson's. It is owned by a registered dietitian specializing in Parkinson's disease. You'll find a Parkinson "Tip of the Day" along with downloadable articles, and ordering information for PD-related nutrition publications.

<http://www.nutritionucanlivewith.com/>



APPENDIX C:

Helpful Products

The following are sources of products that may be helpful to some people with Parkinson's disease.

Beano. In either drops or tablet form, Beano contains enzymes that help to prevent the flatulence often caused by beans, cabbage, and other foods. Most grocery stores and pharmacies carry Beano.

Unifiber. This is a non-gelling fiber that can be mixed into foods to help maintain bowel function. Your pharmacist can order it from:

Niche Pharmaceuticals, Inc.
P.O. Box 449
Roanoke TX 76262
1-800-677-0355

NUTRITION YOU CAN LIVE WITH!
A Series of Diet Resources for People with Parkinson's Disease
Kathrynne Holden, MS, RD

For people with PD, their families, PD support groups, and health professionals: the *Nutrition You Can Live With* series is a must for maintaining optimal nutritional health.

Eat Well, Stay Well with Parkinson's Disease

Explains the nutritional hurdles that occur with PD and provides practical ways to overcome these obstacles and maintain good health. Covers nausea; B vitamin needs; heartburn/acid reflux; food, mood, & stress; protein-levodopa interactions; chewing and swallowing difficulties; medications, more. \$29.95

Cook Well, Stay Well with Parkinson's Disease

First-ever cookbook for those with PD! Lists nutrients and foods of special importance. Includes more than 170 recipes for appetizers, breakfast, main dishes, soups, salads, sandwiches, beverages, snacks, desserts. Special dishes for those who have problems with chewing, or handling eating utensils. Also includes one-day menu templates that allow the reader to design personal eating plans for special needs. \$19.95

Parkinson's Disease and Constipation: Audiocassette and Guidebook

A tape-and-booklet set designed to suit the needs of both individuals and support groups. Answers many important questions, provides easy ways to track intake of fiber and fluids; lists fiber sources. Can be used as a PD support group activity, or by the individual. \$14.95 (additional guidebooks \$3.00)

Parkinson's Disease: Guidelines for Medical Nutrition Therapy.

A manual for health professionals. Includes a three-ring binder with state-of-the-art guidelines for the health professional working with people who have PD. Updated annually. Contains unique information on nutrition support for those using levodopa, as well as PD medications and their nutrition implications. PD-specific assessment tools. Copy-ready patient handouts. \$49.95

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Prices shown are in U.S. dollars

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Cook Well, Stay Well with PD \$19.95 each _____

Parkinson's Disease & Constipation Tape/booklet \$14.95 each _____

Parkinson's Disease: Guidelines for Med. Nutrition Therapy \$49.95 each _____

Shipping/handling: Single copy book/tape orders add \$5.00 inside U.S.; \$12.00 outside U.S.

Shipping/handling: Single copy Parkinson's: Guidelines for Medical Nutrition Therapy add \$10.00 inside U.S.; \$17.00 outside U.S.

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Oregon Health Sciences University
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Olympia, Washington

Parkinson's Disease & Movement Disorders Center
Northwestern University
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Parkinson's Disease & Movement Disorders Center
University of Pennsylvania
Neurological Institute at Pennsylvania Hospital
Philadelphia, Pennsylvania

Fédération de Neurologie
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Regional Parkinson Disease Center
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Wisconsin Parkinson Association
Milwaukee, Wisconsin

Scott & White Clinic
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Segawa Neurological Clinic for Children
Tokyo, Japan

Shands Jacksonville
Parkinson Movement & Disorder Center
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Parkinson Disease Center
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State University of New York
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California Neuroscience Institute
St. John's Hospital
at Catholic Healthcare West
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