

Geriatric Care

Introduction

Diabetes is a complex and chronic debilitating ailment that affects every facet of life and should not be taken lightly. However, the increasing knowledge, scientific and clinical findings, and medical advances allows doctors, health care professionals, nutritionists and patients to learn more about this disease and how to effectively combat it through proper diet, exercise, prevention and treatment. Instead of fear, there is now new hope and confidence. It is apparent that the management of diabetes and prevention of diabetic complications is certainly a doable job. And keeping the glucose within the normal range is a task many patients have found to be successful. In spite of having diabetes, the patient is capable of living a long and healthy life, savor wonderful foods, go anywhere, and do just about anything if proper care and treatment are provided. The patient must be willing to make certain sacrifices and put forth the effort to learn how to correctly take care of the body through proper diet, nutrition, exercise, lifestyle modifications, and medical treatment.

What is Diabetes?

In the United States, diabetes is quite a common illness. An estimated 16 million people have it, which is around 1 out of every 17 individuals. About 1,800 new cases are diagnosed each day. Technically, this disease is known as diabetes mellitus. 'Diabetes' originated from the Greek for excessive urination, a symptom the ancients noticed. 'Mellitus' originated from the Latin for honey because diabetic urine is filled with sugar and is sweet. Physicians and medical books use the term diabetes mellitus, but colloquially, this disease is simply called diabetes.

There are three types of diabetes: type 1, type 2, and gestational diabetes. There are differences depending on type, but everyone with diabetes has one thing in common: little or no ability to move sugar, or glucose, out of the blood and into cells, where it is the body's primary fuel. Modern science does not know exactly what causes diabetes, but it appears to result from a combination of genetics and environmental factors, including viral infections, poor diet, and sedentary lifestyle.

All humans have glucose in the blood, whether or not they have diabetes. This glucose comes from food. After food intake, the digestive process breaks down carbohydrates into glucose, which is absorbed into the blood through the small intestine. People who do not have diabetes rely on insulin, a hormone made in the pancreas, to move glucose from the blood into cells. But people who have diabetes either do not produce insulin or cannot efficiently use the insulin they produce. Without insulin, glucose remains in the bloodstream. When glucose accumulates in the bloodstream, a condition called hyperglycemia, "hyper" meaning too much and

"glycemia" meaning glucose in the blood, results. Hyperglycemia causes intense thirst, the need to urinate frequently, blurred vision, fatigue, and other symptoms. Over time, high blood glucose can cause very serious medical problems. These problems are often called 'diabetic complications' and include:

- 1) Heart Disease ' Heart disease, stroke, and cardiovascular diseases are by far the leading cause of death in the U.S., but compared with non-diabetics, people with diabetes are at much higher risk.
- 2) Kidney Disease - This can be fatal.
- 3) Eye Diseases - Diabetes is a leading cause of blindness.
- 4) Nervous System Disorders - These may interfere with the ability to sense pain, and contribute to serious infections, particularly in the legs and feet.

By adding up the total toll of diabetes complications, this disease is one of the nation's leading causes of death. However, please do not despair! All diabetes complications can be largely prevented and managed by practicing what is known as "tight control", or keeping blood glucose level as close to normal as possible. This takes time and energy, but many diabetics do it successfully and live full lives without much trouble.

TYPES OF DIABETES - Type 1 (IDDM)

Patients with type 1, or Insulin Dependent Diabetes Mellitus (IDDM), cannot produce insulin and need regular shots of it to keep the blood glucose levels normal. Almost half the people with this type of diabetes are age 20 and younger. For this reason, type 1 diabetes was once called juvenile-onset diabetes. Type 1 diabetes accounts for only about 5 to 10 percent of the disease. The vast majority of diabetics have type 2

TYPES OF DIABETES - Risk Factors

- 1) Caucasian race. Diabetes strikes people of every race, but it is most common among Caucasians.
- 2) Age less than 20. Half of people diagnosed with type 1 are under 20.
- 3) A family history of the disease

TYPES OF DIABETES - Causes

1) Auto-antibodies - Type 1 diabetes has many hallmarks of an auto-immune condition. In auto-immune diseases, the immune system, which normally protects the body from disease by killing invading germs, mistakes the body's own cells for germs and destroys them. In the case of type 1 diabetes, the immune system kills the beta cells in the pancreas that produce insulin.

2) Viruses - Type 1 diabetes often strikes shortly after a viral infection, and doctors often notice a sharp jump in type 1 diabetes diagnoses after viral epidemics. The viruses closely related include those that cause mumps, German measles, and a close relative of the virus that causes polio. Viruses do not cause diabetes directly. Instead, these viruses contain proteins that look very similar to proteins found in the pancreas' insulin-producing beta cells. The immune system presumably mistakes the beta cells for virus particles and destroys them, which destroys the body's ability to synthesize insulin.

3) Chemicals and Drugs - Studies have shown that Pyriminil, a poison used to kill rats, triggers type 1 diabetes. Also two prescription drugs, pentamidine, used to treat pneumonia, and L-asparaginase, used in cancer treatment also triggers type 1 diabetes. All the chemicals and drugs that cause type 1 diabetes do so by destroying the beta cells.

4) Cow's Milk - Exposure to cow's milk during infancy may increase the risk of type 1 diabetes. Cow's milk contains a protein similar to a protein found on beta cells. The theory is that if infants develop antibodies to the cow's milk protein, they may mistake the beta cells for milk and destroy them. However, even a remote chance that cow's milk might increase risk of diabetes strengthens the case for breastfeeding. 5) Genetics/Lifestyle - Diabetes is not strictly genetic. Most children of diabetic parents do not develop the disease. However, scientists have long suspected that heredity plays a role because type 1 diabetes tends to run in families. A lifestyle factor also exists because certain bad habits that are passed on through the family can also cause disease. A family history of the disease increases risk.

TYPES OF DIABETES - Type 2 (NIDDM)

Ninety to ninety-five percent of people with diabetes have type 2, or Non-Insulin Dependent Diabetes Mellitus (NIDDM). Type 2 diabetics produce insulin, but cells within the body are insulin resistant. By not responding properly to the hormone, glucose accumulates in the blood. Insulin resistance increases as weight increases and physical activity decreases. Not surprisingly, most people with type 2 diabetes have sedentary lifestyles and are obese. It is estimated that these patients weigh at least 20 percent more than what is recommended for their height and build. Some people with type 2 diabetes must inject insulin, but most can control the disease through a combination of weight loss, exercise, correct food and nutrition intake, herbal medicine and proper treatment.

TYPES OF DIABETES - Type 2 (NIDDM) - Risk Factors

- 1) Age - Nearly all people diagnosed with type 2 are over 30 years old. Half of all new cases are age 55 and older.
- 2) Race and Ethnicity - Compared with Caucasians and Asians, type 2 diabetes is more common among Native Americans, African Americans, and Hispanics.
- 3) Being overweight or obese - Insulin resistance increases with weight.
- 4) High-fat diet - A key cause of obesity.
- 5) Sedentary lifestyle - Insulin resistance increases with lack of exercise.
- 6) Women who have had gestational diabetes - Previous gestational diabetes increases risk of type 2 diabetes years later.
- 7) Women who have given birth to babies weighing 9 pounds or more.
- 8) Genetics/Lifestyle - Like type 1 diabetes, type 2 also runs in families.

TYPES OF DIABETES - Type 2 (NIDDM) - Causes

- 1) Obesity - Obesity is the single most important cause of type 2 diabetes, because carrying excess body fat causes insulin resistance. Definitions of obesity differ, but in general obesity occurs when the patient weighs at least 20 percent more than what is recommended for their height and build. Three-quarters of type 2 diabetics are or have been overweight. For this reason type 2 diabetes is usually treated with diet and exercise. Dropping weight and gaining muscle helps the body use insulin more efficiently. Also, where the patient carries the weight is as important as how much weight is carried. People who carry fat above their hips ("apple shape") have a greater risk of developing type 2 diabetes than those who carry it on their hips ("pear shape").
- 2) Genetics/Lifestyle - Diabetes is not strictly genetic. However, scientists have long suspected that heredity plays a role because type 2 diabetes also tends to run in families. A lifestyle factor also exists because certain bad habits passed on through the family can also cause disease. A family history of the disease increases risk.
- 3) Age - Age also plays a role in type 2 diabetes. Half of all new diagnoses are in people over 55, and nearly 11 percent of Americans aged 65 to 74 have type 2 diabetes. However, it's not clear whether age, per se, is a cause of type 2 diabetes, or simply a reflection of the fact that people tend to gain weight and become less physically active as they grow older.

TYPES OF DIABETES - Gestational Diabetes

Gestational diabetes develops only in pregnant women with no previous history of diabetes. Nearly 135,000 women develop gestational diabetes each year. Typically, gestational diabetes clears up after women have delivered their babies. But studies have shown that about 40 percent of women with gestational diabetes go on to develop type 2 diabetes within 15 years. All pregnant women should be tested for gestational diabetes between the 24th -28th weeks of pregnancy.

TYPES OF DIABETES - Gestational Diabetes - Risk factors

- 1) Obesity - Because it increases insulin resistance.
- 2) Race and Ethnicity - Hispanic Americans, Native Americans, and African Americans are at increased risk, presumably because compared with Caucasians and Asians, they are more likely to be overweight.
- 3) Genetics - It tends to run in families.

Mark TYPES OF DIABETES - Gestational Diabetes - Causes

- 1) Hormones - Pregnant women produce various hormones essential to the baby's growth. However these hormones may also make the mother insulin resistant. All pregnant women have some degree of insulin resistance, but if this resistance becomes full-blown gestational diabetes, it usually appears around the 24th week of pregnancy. For this reason, all pregnant women should be screened for gestational diabetes around that time.
- 2) Genetics/Lifestyle - Because both gestational and type 2 diabetes develop due to insulin resistance, researchers suspect that these two conditions have a similar genetic basis. However, diabetes is not strictly genetic. A lifestyle factor also exists because certain bad habits passed on through the family can also cause disease. A family history of the disease increases risk.

DIETARY MANAGEMENT - Cut the Fat!!!

After smoking, a high-fat diet is the second most lethal habit. This is true for all Americans, but particularly for people with diabetes because the disease greatly increases the risk of cardiovascular disease, heart attack and stroke. According to a report in the Journal of the American Medical Association, smoking causes 400,000 deaths a year. High-fat diet causes 300,000. Several more highly publicized social evils are: alcohol (100,000 deaths), guns (35,000), auto accidents (25,000), and drug abuse (20,000). These statistics in no way minimize the tragedies of alcoholism,

murder, or drug addiction. But they provide perspective on what is really killing Americans. Few people cringe when 'Aunt Sally' serves up large slices of banana cream pie a la mode, but from a public health perspective, she might as well be offering heroin. If this sounds a bit extreme, consider the dangers of dietary fat:

1) Diabetes - Diabetes contributes to more than 250,000 deaths a year. More than 90 percent of people with diabetes have type 2 disease. The main risk factor for type 2 diabetes is obesity, and a prime cause of obesity is a high-fat diet.

2) Obesity - "Obese" means to weigh 20 percent more than the recommended weight for your height and build. Obesity is the prime risk factor for type 2 diabetes. It also increases risk of heart disease, several cancers, hypertension, and arthritis. It is a problem only in countries with a high-fat diet.

3) Heart Disease - The nation's leading cause of death, heart disease kills 720,000 Americans a year, most as a result of heart attacks. Compared with non-diabetics, people with diabetes have three times the risk of heart disease. A high-fat diet is a key cause of the cholesterol-rich deposits called plaques that narrow the coronary arteries and trigger heart attacks. Virtually all Americans, especially diabetics, have these plaques in the coronary arteries. This build-up begins to develop as soon as people start eating a high-fat diet, which in American means during childhood. A 1993 study by Jack Strong, M.D., chair of the pathology department at Louisiana State University Medical Center in New Orleans, analyzed autopsies of 1,532 teenagers who died in accidents. One hundred percent showed plaques in their aortas, the body's largest artery.

4) Stroke - Stroke is the nation's third leading cause of death, claiming 144,000 lives a year. Compared with non-diabetics, people with diabetes have five times the risk of stroke. There are two major types of stroke, one caused by bleeding in the brain (hemorrhagic), and the other by blockage of an artery there (ischemic). About 75 percent of strokes are ischemic, and the vast majority of ischemic strokes are caused by cerebral thrombosis, blockage of a brain artery in a process similar to heart attack. Just as a high-fat diet contributed to heart attack risk, it also boosts risk of stroke.

5) Cancer - A high-fat diet does not contribute to all cancers, but many studies have linked it to several, notably colon and breast cancer, which together account for more than 100,000 deaths a year. Other studies suggest that a high-fat diet may play a role in causing cancers of the prostate (38,000 deaths annually), pancreas (26,000), and possibly lung cancer in nonsmokers (30,000), and malignant melanoma (6,900). The American Cancer Society and the National Cancer Institute urge everyone to eat less fat.

6) Hypertension - Popularly known as "high blood pressure," hypertension is a major risk factor for heart disease and stroke. High-fat diet contributes to this condition

because it adds extra pounds. As weight increases, the heart must work harder to pump blood through all the extra tissue. As the heart's effort increases, so does blood pressure.

7) Weight-Related Arthritis - Dietary fat contributes to the most common form of arthritis, osteoarthritis, because excess weight subjects the major joints to extra wear and tear.

In the words of William Castelli, M.D., longtime director of the Framingham Heart Study, the nation's oldest ongoing research program into the causes of heart disease, "Most Americans who have chronic health problems would not have them if they consistently ate a low-fat diet.?"

Today, according to a recent report by the National Center for Health Statistics, American fat consumption averages 34 percent of total calories. That average is down slightly from 1978, when the figure was 36 percent, but averages can be misleading. Some Americans have cut way back on fats, but millions, including most type 2 diabetics, still consume at least twice as much fat as their great-grandparents did. Compared with 1992, in 1993, U.S. sales of butter, ice cream, and high-fat cookies and fast-food meals increased by almost \$1 billion. It's clear Americans still have a long way to go to reduce their risks of the fat-related health problems. There are two ways to reduce the amount of fat in one's diet - gradually or drastically. The gradual approach will be presented first, then the drastic. The gradual approach is better suited to most people's tolerance for change. But if the patient already has serious diabetes complications, the drastic approach may be better fit.

Gradually gearing the diet away from fats begins with reading food labels. The new nutritional label created by the Food and Drug Administration states the percentage of calories from fat in one serving of the item. As a general rule, select foods that contain no more than 20 percent of calories from fat per serving. Or simply stick to items that contain fewer than 3 grams of fat per serving. But beware that sometimes the serving size represents less than what is consumed, meaning that its actual fat content is higher.

Do not be fooled by the Daily Value (DV) listing. The DV tells how much of the day's worth of fat, cholesterol, sodium, etc., the food provides, based on a hypothetical 2,000-calorie-a-day diet. DV ratings are in bold on the new nutrition labels, but they often understate the amount of fat an item contains. A snack food might have a fat DV of 25 percent, which might seem acceptable to the unsuspecting consumer, but still contain 75 percent of calories (or more) from fat.

Labels that proclaim the item to be some enormous percentage fat-free are the biggest abominations in the supermarket. These labels contain a tiny germ of truth. An item that claims to be 96 percent fat-free is by weight. But weight doesn't matter.

What matters is its percent of calories from fat. Whole milk contains only 4 percent fat by weight, so it's 96 percent fat-free. But a whopping 50 percent of its calories come from fat. Low-fat milk (2 percent) derives 38 percent of its calories from fat. And watch out for things like Lite mayonnaise. Regular mayo derives about 95 percent of its calories from fat. Lite mayonnaise is lower, but more than 75 percent of its calories come from fat.

As far as unlabeled foods are concerned, the following is a general guideline. But remember to still pay attention to how many carbohydrates consumed or the blood glucose level may become elevated.

1) Fruits, Vegetables, and Beans ? They are low in fat, as long as they are not smothering in high-fat butter, margarine, or cream. But these are all high in carbohydrates, and diabetic patients have to watch the carbohydrates.

2) Pastas and Grains - This is another food group that is low in fat and high in carbohydrates. Eat more of these foods, but at the same time, closely monitor glucose levels.

3) Breads - Beware of crackers, muffins, biscuits, croissants, and other bread treats, which are high in fat. In addition, be careful of high-fat spreads such as butter, margarine, peanut butter, and cheeses. There are low-fat choices such as 100% real fruit spreads, bean dip, and soy yogurt, however, pay attention to the blood glucose level.

4) Nuts and Seeds ? Use a variety of nuts and seeds in moderation to top fruits, vegetables, beans, pastas or grains.

5) Eggs - Limit egg intake and use substitutes whenever possible. For scrambled eggs or omelets, mix one real egg into a bowl containing mashed tofu and cook. Tofu omelets are both nutritious and delicious.

6) Meats - Of all the red meats, only venison contains fewer than 20 percent of calories from fat. Beef, veal, pork, lamb, duck, sausages, and luncheon meats are all high in fat. Instead of building meals around them, choose recipes that use small amounts of meat to flavor dishes based on vegetables, beans, or grains, the way Asian cuisines do.

7) Fish and Seafood - Most fish and seafood is low in fat: cod, flounder, trout, snapper, and sole. But several fish are fairly high in fat: herring, mackerel, and salmon. To keep fish low in fat, bake, broil, poach, or grill it. Do not fry it in butter or margarine or cover it with butter- or cream-based sauces. Use smaller portions and combine them with vegetables, beans, and grains.

8) Butter, Margarine, Oils ? They are all 100 percent fat. Butter is harmful because it's the highest in saturated fat, which raises cholesterol, and contributes to heart disease. But margarine contains trans-fatty acids, which also increase risk of heart disease. Olive oil, a mono-saturated fat, does not increase risk of heart disease, nor, according to some studies, the risk of breast or colon cancer. But olive oil still is fat, therefore use it sparingly. One good way is to reduce the amount recipes call for. If a recipe suggests 2 tablespoons of olive oil, try one tablespoon or substitute with vegetable or miso broth. Most people who cook with vegetable oil sprays use less oil than they would if they simply poured liquid oil into their pans. Also, try vinegar or lemon juice with just a splash of oil.

9) Snacks - Snacks are the downfall of many people. A bag of potato chips, cookies, and most candy is a one-way ticket to high-fat trouble. But today, low-fat eaters can choose dozens of convenient, tasty, creamy, crunchy, satisfying low-fat snacks such as 1) Fresh fruit, stewed fruit, or canned fruit without heavy syrup. 2) Air-popped popcorn. Instead of butter, add herbs such as oregano. 3) Whole grain breads, nonfat crackers, or rice cakes with 100% fruit spread. 4) Chilled vegetable salad. Steam the veggies and then add soy sauce, balsamic vinegar, lemon or juice or a low-fat marinade and refrigerate. 4) A bowl of cereal with soybean milk. 5) Nonfat soy yogurt. Add fresh fruit, or for crunch, try cereal.

10) Use Lowfat and Nonfat Foods

11) Eat Mindfully - While eating, do not do anything else, such as read, work, household chores, or watch TV.

12) Eat Breakfast - For most people it is easier to banish the fat from breakfast than from any other meal. Try 1) Toast with fruit spread, soybean paste or sesame tahini. 2) Oatmeal with Soybean Milk. 3) Cereal with Soybean Milk.

DIETARY MANAGEMENT - Pay Attention to Carbohydrates!!!

In addition to focusing on fat, people with diabetes have to count carbohydrates as well. This is especially true for people with type 1 diabetes and those who use insulin. Carbohydrates are the starches and sugars in food. While very little fat and protein becomes glucose, almost all the carbohydrate does. As carbohydrate is broken down into glucose and absorbed, the blood sugar level goes up. Many dietitians and diabetes educators recommend regulating the number of carbohydrates eaten each day. In the short run this will help avoid roller-coaster blood sugar levels; in the long run it will help avoid serious complications of the disease.

Millions of Americans grew up believing that carbohydrates (starches and sugars) were the major dietary villains. They viewed potatoes and cakes as "fattening," and thought weight loss involved limiting the total number of calories one ate. The

centerpiece of restaurant "diet plates" was a low-carbohydrate, but high-fat ground beef patty. But in the last 20 years, nutrition scientists have shown that there is really a great villain in the American diet - fat.

Carbohydrates, including fruits, vegetables, beans, and grains provide most of the body's energy. Of course, people with diabetes must control carbohydrate intake to prevent hyper- and hypoglycemia. But for people who eat a healthy number of daily calories (around 1,500 to 2,000 depending on height and activity level), carbohydrates are not fattening. Only fat is.

By limiting fat calories, it is not as important to worry too much about total caloric intake. It's not the potato that's fattening, it's the butter, sour cream, and bacon bits people put on it. The same goes for desserts. Cakes, pies, and ice cream are fattening because they are loaded with fat. It is people's 'fat tooth' and 'sweet tooth' that gets people into trouble.

How could this be? Simple: All calories are not created equal. One gram of carbohydrate or protein contains only 4 calories, but one gram of fat contains 9. Fat calories really sneak up on you. A few handfuls of potato chips have the same number of calories as two medium-sized baked potatoes and steamed vegetables. Carbohydrates have a lot of bulk per calorie. Eating them triggers feelings of fullness, making it difficult to overeat. By reducing fat consumption from the typical 35 to 40 percent of calories down to the 10 percent level of my program, it is possible to eat one-third more food without increasing the total number of calories. The body feels full and satisfied plus the risk of heart disease and the other fat-related diseases are reduced. In addition, you lose weight.

Besides the high calorie content of fats, they are also metabolized differently from carbohydrates. The body uses most carbohydrates quickly, and can only store about one day's worth as glycogen in the liver and in muscle tissue. When eating normal amounts, carbohydrates are never stored as fat. Fats, on the other hand, are not metabolized right away. They are stored in adipose tissue, which has an almost unlimited capacity to bulge with fat. Unlike carbohydrates, fat calories do not cause the same feelings of fullness, so the individual continues eating, gains weight, and increases the risk of fat-related diseases.

Everyone must consume some fats because they are necessary for the synthesis of essential fatty acids. But only about 5 percent of calories from fat are required to produce all the essential fatty acids the body needs to function optimally. If high-fat diets contribute to a host of diseases, do low-fat diets help prevent them? Yes, the fact that low fat diets help reverse heart disease have been corroborated by studies, most recently summarized in a report cosponsored by the AHA, the American Cancer Society, and the Center for Science in the Public Interest, a Washington-based consumer nutrition organization. If Americans cut fat consumption by about one-third

(down to approximately 20 percent of calories from fat), diabetes, heart disease, and cancer would decline significantly, and the nation's health care bill would plummet an estimated \$17 billion a year.

DIETARY MANAGEMENT - Choice of Sugars

There are many choices of sugars that may or may not be suitable for the diabetic patient. Before beginning using sugars, please consult a doctor or nutritionist.

- 1) **Carob Powder or Carob Flour** - This is made by grinding pod of carob tree. Seventy-five percent consists of sucrose, glucose, and fructose.
- 2) **Fructose** - One of the most common natural sugars. It is found mostly in fruit and honey. If the diabetes is under good control, it should not cause rapid or significant rise in blood glucose level.
- 3) **Glucose (corn sugar, dextrose, grape sugar)** - Another common natural sugar. It causes a quick and significant rise in blood sugar. The body creates glucose during digestion by breaking down carbohydrates in food and uses it for, among other things, energy. Glucose builds up in the blood if the diabetes is not well controlled.
- 4) **Glucose Syrup (corn syrup, corn-syrup solids, sorghum syrup, starch syrup, sugar-cane syrup)** - These are produced from starch. They contain a mixture of glucose and maltose molecules.
- 5) **High-Fructose Corn Syrup** - Made from corn syrups. These contain from 42 to 90 percent fructose. If the diabetes is under good control, it should not cause rapid or significant rise in blood glucose level.
- 6) **Honey (comb honey, cream honey)** - A natural syrup that varies in sugar and flavor. It contains about 35 percent glucose, 40 percent fructose, and about 25 percent water.
- 7) **Lactose** - This is milk sugar. It makes up 4.5 percent of cow milk.
- 8) **Maltose** - Formed by two linked glucose molecules, maltose rapidly breaks down to glucose in the intestine.
- 9) **Mannitol** - A naturally occurring sugar alcohol, mannitol causes less of a rise in blood sugar than sucrose or glucose. However, in large amounts it can cause diarrhea.
- 10) **Maple Syrup (maple sugar)** - Made from the sap of maple trees. It is mostly sucrose with some invert sugar.

11) **Milk Chocolate (bitter chocolate, bittersweet chocolate)** - Made by mixing milk, sugar, and cocoa butter to bitter chocolate. Milk chocolate contains about 43 percent sugar. Bitter-sweet chocolate contains about 40 percent sugar.

12) **Molasses (blackstrap, golden syrup, refiners' syrup, treacle, unsulphured)** - These contain from 50 to 75 percent sugar and should generally be avoided by diabetics.

13) **Sorbitol** - A naturally occurring sugar alcohol found in plants. It is more slowly absorbed than glucose and causes only a small rise in blood glucose in people whose diabetes is well controlled. In large amounts it can cause diarrhea.

14) **Sucrose (beet sugar, brown sugar, cane sugar, confectioner's sugar, invert sugar, powdered sugar, raw sugar, saccharose, sugar, table sugar, turbinado)** - A naturally occurring sugar made from sugar cane or sugar beets. It is what most people think of when the word 'sugar' is said. It is made of equal parts glucose and fructose.

15) **Sweetened condensed whole milk (sweetened condensed skim milk, sweetened condensed whey)** - Made by cutting the water content of milk by about half and then adding sugar. The final product is about 44 percent sucrose.

DIETARY MANAGEMENT - Carbohydrate Counting

For years, many people with diabetes have used exchange lists to plan meals. In this system, foods with the same amount of a given nutrient (protein, fat, or carbohydrate) are grouped together. The patient then picks and chooses from the different categories to make a meal. Exchange lists provide a degree of menu flexibility, but there is a way to get even more variety and choice of foods without losing control of the blood sugar. It is called "carbohydrate counting", or carb counting for short.

Carbohydrate is the sugar and starch found in food, which is the substance that most directly affects blood sugar. With carb counting, the diabetic patient keeps track of the carbohydrate in food. Today, many people with diabetes are using carb counting to fine tune the glucose control, and at the same time, expanding food options beyond what the exchange lists allowed. Carb counting has some major advantages, but mastering it requires time and patience. To learn how to do it properly, it is important to consult a doctor.

DIETARY MANAGEMENT - Carbohydrate Counting - Understanding Carbohydrate Counting

To understand how carb counting works, it is important to understand how glucose gets into the bloodstream. For example, imagine eating a fatty cheeseburger and washing it down with a big vanilla milkshake. Most of this food will eventually end up in the blood as glucose. But how much, when, and how fast? Research shows that very little of the fat is converted into glucose, and some of the protein is very slowly converted into glucose.

By contrast, within an hour or so, more than 90 percent of the carbohydrate consumed becomes glucose. This means that when the blood is tested one to two hours after a meal, most of the rise in blood glucose comes from the carbohydrate. Carb counting can help predict how the blood glucose level will be affected depending upon how much carbohydrate is consumed. If little carbohydrate is consumed, the blood sugar rises a little. If a lot of carbohydrate is consumed, the blood sugar rises a lot. Insulin balances glucose. So one way to control blood glucose levels is to match insulin to carbohydrate.

DIETARY MANAGEMENT - Carbohydrate Counting - Getting Started

At first, carbohydrate counting will seem like a hassle, but in time it becomes habit. Having the patient keep accurate records helps piece together exactly how lifestyle affects diabetes. And this, in turn, enables the patient to minimize the effects of diabetes on lifestyle.

- 1) Test blood glucose several times a day and record blood glucose (BG) levels before and after every meal.
- 2) Start measuring the amount of carbohydrate in meals.
- 3) Keep clear, accurate records of the following:
 - Times and results of your blood glucose readings
 - All foods eaten (calculated in grams of carbohydrate) ?Time of meals and snacks ?Time, type, and dose of insulin or oral medications
 - Type, duration, and intensity of exercise
 - Any additional influences on blood glucose level, such as illness, stress, and menstrual period.

DIETARY MANAGEMENT - Carbohydrate Counting - Make a Meal Plan

To get started counting carbohydrates, a meal plan must first be created. A doctor can help decide how much carbohydrate, as well as how much protein, fat, and calories the patient should eat every day. Each plan should be personalized to suit individual eating habits, lifestyle, medication regime, and any unexpected changes in

routine. The patient should try to eat the same amount of carbohydrate at each meal or snack whether medications are taken or not. When the amount of carbohydrate changes significantly, the blood sugar levels become harder to predict.

Carbohydrate counting gives more freedom to choose what to eat, however, the patient must also be aware not to overeat proteins and fats to avoid weight gain and certain diseases. If the patient is trying to lose or maintain weight, it is important to watch fat intake, especially saturated fat. Saturated fat clogs the arteries and increases risk of a heart attack, which is the leading cause of death among diabetics. Also, dietitians recommend to eat 5-6 servings of vegetables and 1-2 servings of fruit each day as part of the daily carbohydrate choices to maintain good nutrition.

DIETARY MANAGEMENT - Carbohydrate Counting - Measuring Carbohydrates

Learning how many grams of carbohydrate are in foods is an important practice. Exchange lists are a good place to start. They list the rough carbohydrate content for specific measurements of foods. To obtain exchange lists, ask a doctor, certified diabetes educator, or call the American Diabetes Association, which publishes several books on the subject. The secret of carbohydrate counting is figuring out how much carbohydrate is found in one portion. One way is to figure this out is to look at the exchange lists. On these lists a single portion is equal to 15 grams of carbohydrate, or one carbohydrate choice. Another way is to look at the "Nutrition Facts" label on food packages. Nutritional labels list the number of grams of carbohydrate in one serving of that food. The patient will then need to weigh or measure the food according to the serving listed on the package or exchange list. To measure food, measuring cups, spoons, and a food scale are needed. Measuring cups and spoons measure the volume of foods. Scales measure the weight. A doctor can help choose the equipment and demonstrate how to use it.

It takes time, effort, and practice to learn portion sizes. But once the patient gets used to gauging portion sizes, they will be able to 'eyeball' foods and will not have to measure everything every time. Usually it takes several weeks of measuring, recording, and calculating to become comfortable with carbohydrate counting. The patient will be ready to start calculating insulin-to-carbohydrate ratio once they have a list of the carbohydrate content of various foods and have practiced eyeballing portion sizes of a wide variety of foods. This is only one of the methods used to control glucose levels and may not be a practical solution for every diabetic patient.

DIETARY MANAGEMENT - Carbohydrate Counting - Patients With Diabetic Complications

Complications result from poor blood glucose control. The patient must work with a medical team to learn how to gain better control. In addition, a gradual

approach to reducing fat intake may not trim enough fat from the diet to prevent health disaster. This is especially true for type 2 diabetics. The patient may need drastic dietary changes.

DIETARY MANAGEMENT - Carbohydrate Counting - Proper Healthcare

It is essential for diabetic patients to receive the proper health care, therefore, natural medicine is strongly recommended. Acupuncture, herbal medicine, dietary supplements and food medicine treats diabetes and related complications. These natural treatment methods help balance the stomach, spleen and liver systems, benefit the eyes, help improve circulation, and strengthen the immune system.

Modern drug medicine offers treatment methods to control diabetes. However, they pose side effects and do not target the root cause. Our clinic works with patients who only utilize natural medicine for treatment of diabetes as well as those who choose to use hormonal and drug therapies. We also help patients taper off of insulin and oral drug medications safely and effectively.

DIETARY MANAGEMENT - Carbohydrate Counting - Consult A Qualified Doctor and Nutritionist

It is strongly encouraged for diabetic patients to seek the help and advice of a healthcare provider who has achieved proven methods of success in the area. It is vital to know how to regulate blood sugar through the food intake, and the diet has proven to be an effect method to control diabetes. Therefore, diabetic patients need to pay special close attention to their bodies and if certain symptoms develop, to approach it directly, effectively and knowledgeably.

Our clinic offers quality food and nutrition consultations, seminars, and a PERSONALIZED FOOD MEDICINE manual to help the diabetic patient with dietary guidelines. We recommend the essential nutrients needed by the body as well as educate the patient on proper food care for recovery and healing. General supplements for diabetic patients include Daily Essentials, Eye and Liver Essentials, Herbal Adaptogens, Ginkgo Biloba, and DBTS-1, 2, 3, and 4. Please consult a healthcare professional first before beginning these or any supplements.

EXERCISE AND DIABETES SELF-MANAGEMENT

Regular exercise is crucial to the management of both type 1 and type 2 diabetes. Exercise increases cellular insulin sensitivity, which can help reduce the dose of insulin or oral medication. It decreases risk of cardiovascular disease, by far the leading killer of people with diabetes. It burns calories, which helps control weight, and it has an antidepressant, mood-elevating effect, which improves self-esteem, and counteracts the emotional blues of having a chronic disease. But exercise can also

increase risk of hypoglycemic crises, aggravate ketoacidosis, and cause bleeding into the eye in those with proliferative retinopathy.

So, while diabetics should exercise regularly, they also need to exercise prudently. Everyone with diabetes responds individually to exercise. Beyond the need to exercise, no generalizations apply to everyone all the time. That is why it is important to test the blood glucose frequently to get a good feel of how the body personally responds. It is a process of trial and error, and it may feel frustrating at times. Therefore, the patient is always encouraged to contact a physician and/or healthcare team to address any questions or concerns. In addition, these guidelines will help:

1) First, see a doctor. Anyone can exercise, but the individual physical condition and blood glucose profile may limit the kind of exercise regimens that are safe.

- Glycated Hemoglobin - This blood test provides a snapshot of the blood glucose control for the past three months.
- Blood Pressure - Exercise can raise it.
- Feet - Because of neuropathy, many diabetics lose pain sensation in the feet, and may not know they have cuts or damage. Because of cardiovascular complications, many diabetics have poor circulation in the lower legs, which means cuts and other foot injuries heal slowly, if at all, and may become seriously infected.
- Vision - In proliferative retinopathy, abnormal, very fragile new blood vessels develop in the eye that may rupture with high-impact exercise. Get proliferative retinopathy treated before embarking on an exercise program, and have your eyes monitored frequently.
- Nervous system - Get checked for neuropathy. Depending on which part of the body is affected - limbs, heart, digestive tract, etc. - the exercise regime may need to be modified.

2) Choose an exercise program that fits individual physical condition. If the patient has been out of shape for a long time, he or she should start with something non-strenuous, for example, a leisurely walking program. If the patient is in reasonably good shape, but has a history of proliferative retinopathy, he or she should not run or play basketball. Instead, try low-impact swimming or biking. If the patient does not have much feeling in the feet, walking, running, and dancing may not be appropriate types of exercise, but swimming might.

3) Always be conscious of the feet. Check feet before exercise. If there are signs of irritation, use pads to cushion the area. If there are cuts, wash with soap and water,

treat with an antibiotic ointment, and bandage them. During exercise, wear comfortable shoes and socks. After exercise, check the feet again.

4) For Type 1 patients, test blood glucose twice before exercising. The ADA recommends the following for pre-exercise blood glucose testing: Take one test an hour before and then another one 30 minutes before beginning the workout. Two tests allow the patient to see if the glucose is stable or dropping. Physical activity usually lowers blood glucose because the muscles use it during exercise. For most people, the safe pre-exercise blood glucose range is from 100 to 200 mg/dl. If the glucose is less than 100 mg/dl, or if it's dropping down to close to 100, have a snack to raise it before exercising. If it is between 100 and 150 mg/dl, test during exercise, be prepared to snack to keep glucose up. Physicians often tell people with Type 2 diabetes not to exercise with a blood glucose level over 200. When in doubt, consult a health care team.

5) Do not exercise if the patient has 1) Type 1 diabetes and the blood glucose level is greater than 250 mg/dl and there are moderate or high levels of ketones in the urine. Moderate to high urinary ketones mean that the insulin is too low and the body is breaking down fats for fuel. Do not exercise until the glucose is down near normal and the ketones are down to traces. 2) Blood glucose is greater than 300 mg/dl. Consult a health care team immediately, and bring it down before exercising.

6) If the patient begins a new activity, increases workout intensity or duration, test the blood glucose every 30 minutes during exercise. It is hard to predict how new activities, intensified or extended exercise will affect the blood glucose level. Do not take chances. Test every 30 minutes until patient is comfortable with how new activity affects glucose level. Have snacks on hand and be prepared to eat them during hypoglycemia crisis.

7) Test blood glucose several times after exercise. The more strenuous the workout, the longer afterward it can lower blood glucose. Exercise draws on glucose stored as glycogen in the muscles and the liver. After exercise, the muscles and liver replenish spent glycogen stores by taking glucose out of the blood. Depending on the intensity and duration of workout, it may take as long as 24 hours for glycogen stores to be fully replaced.

8) Consider glucose self-test during the middle of the night (3 a.m.). The glucose level may be affected for up to 24 hours, including through the night.

9) The patient may need to decrease insulin dose or oral medication dosage. Exercise increases cellular insulin sensitivity, so less insulin is needed to move glucose into the cells. Exercise draws glucose out of the blood as the muscles use it for energy. Finally, compared with resting, exercise makes insulin start to work sooner, and peak sooner. Consider reducing insulin or medication dose. With regular exercise, many type 2

diabetics can eliminate insulin and medication altogether. Some type 1's can lower insulin dosages as well.

10) Understand that exercise may raise blood glucose. Strenuous exercise may stimulate the liver to release glycogen into the blood as glucose. If blood glucose level is already high, exercise might push it into the danger zone. For this reason, it is important to test before, during, and after exercise.

11) Do not exercise when insulin is peaking. When insulin is at its strongest, it moves a great deal of glucose out of the blood. If exercising at the same time, the patient may develop serious hypoglycemia. In addition, an exercising muscle absorbs insulin faster than a muscle at rest, further increasing risk of hypoglycemia. Ideally, wait an hour after injecting insulin to exercise.

12) Try not to get discouraged when starting an exercise program that throws off blood glucose control. This happens to almost everyone with diabetes.

13) Exercise can help type 2 diabetics get off insulin and drugs. In a 1994 study reported in *Diabetes Care*, University of California researchers placed 652 non-insulin-dependent diabetics on a three-week daily walking program plus an ultra-low-fat diet (10% of calories from fat, 75% from carbohydrates). The diet-exercise program greatly increased participants' insulin sensitivity. Among those taking insulin, 39% were able to stop injecting. Among those taking oral diabetes medication, 71% were able to stop taking it.

14) Forget intensity. Focus on regularity. Slow and steady wins the race to fitness and better health. Exercise regularly, the ideal is daily. It is not difficult for most people to walk for 20 minutes a day. Never push the body beyond what feels comfortable. That simply leads to exhaustion and frustration, which makes people quit exercising. Slow and steady is the way to go.

15) To avoid injury, warm up and cool down. Stretch or stroll for five to 10 minutes before exercise, and stretch or stroll again for five to 10 minutes before stopping exercising.

16) Drink water before, during, and after exercise. The muscles are 75 percent water, the brain, 70 percent, the blood, 85 percent. Even minor dehydration interferes with strength, stamina, coordination, and reaction time. Nancy Clark, M.S., R.D., director of nutrition at Sports Medicine Brookline, near Boston, recommends one to two cups of water 15 minutes before exercise, frequent water breaks during workouts, and more water afterwards. The hotter the weather, the more important adequate hydration becomes. Keep a water bottle close at hand, and use it. Drink frequently and do not become thirsty.

17) Watch the temperature. Exercise is beneficial, but it also stresses the body. Extreme temperatures are also stressful, and the two together may not be good. In general, do not exercise outdoors if the temperature is over 80 degrees Fahrenheit, especially if the humidity is high, or if the wind-chill factor is 15 degrees Fahrenheit or lower.

18) Forget "no pain, no gain." If something hurts, stop exercising. It is no fun to exercise in pain, and doing so risks injury.

19) Even though diabetes is a chronic disease, it does not have to cease daily routine, hinder social life, ruin family time, cause starvation, or stop what we enjoy in life. In fact, most diabetics can lead a long and normal life if certain changes and modifications are enforced. This certainly gives new light and hope that there is a way to prevent complications, facilitate a recovery and even find successful treatment for this illness.

20) Diabetic patients should rest on a firm foundation of self-care by adopting a healthy diet and lifestyle. Health and wellness will ultimately be up to the patient. He or she must be self-disciplined, must be inquisitive and thirst for knowledge and information, and most importantly, must want to get well and do what is best for the sick body.

21) Adopting a healthy diet and lifestyle is all about making permanent personal changes. Changes are tough, no doubt about it, but they can also be successful, enjoyable and fulfilling. The diabetic patient is encouraged to make changes slowly and consciously - one small step at a time. Forget the crash diets and this month's hot new fitness routine. Instead, take just one easy step toward the new healthy diet and lifestyle by exploring appropriate treatment, food medicine, nutrition, proper exercise, and weight management.