

# How to lower risk of developing diabetes and its complications

## Recommendations for the patient

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**Editor's Note:** Unlike the rest of the articles in this special edition, this article is directed to patients with diabetes. Clinicians can use the article to help patients understand their risks of developing diabetes and diabetes-associated complications.

**D**iabetes is one of the most costly and troublesome chronic diseases in the United States and elsewhere.<sup>1</sup> About 17 million Americans (6.2 percent) have diabetes, and each year about 1 million more adults are diagnosed with this disease.<sup>2,3</sup>

Normally, the food we eat is broken down into glucose that is moved from the bloodstream into body cells where it is used for fuel. The body needs insulin to help move glucose from the bloodstream into cells. People with diabetes have high blood sugar levels because they do not make enough insulin, it does not work as well as it should, or both. If glucose cannot get into cells, it builds up in the blood, overflows into the urine and passes out of the body unused. Thus, for people with diabetes, the body loses its major source of fuel, even though the blood contains large amounts of glucose.<sup>2,3</sup>

In this article, we address the prevention and management of three types of diabetes: type 1, type 2 and gestational. People who have type 1 diabetes need to take insulin every day. Type 1 diabetes develops when the immune system destroys

**Background.** The purpose of this article is to help dental patients learn more about diabetes, including its prevention and treatment. Clinicians can use the article to help patients understand their risks of developing diabetes and diabetes-associated complications.

**Types of Studies Reviewed.** The authors reviewed information regarding diabetes and oral health available through Medline (from January 1995 through March 2003) and the web sites or offices (as of April 2003) of the American Diabetes Association, National Diabetes Information Clearinghouse, National Institute of Diabetes and Digestive and Kidney Diseases, and National Institute of Child Health and Human Development. Special emphasis was placed on locating informational resources appropriate for patients.

**Results.** Diabetes is diagnosed in more than 1 million Americans each year. The disease can be associated with serious complications and premature death. However, diabetes often can be prevented or delayed; if it does develop, it can be treated and controlled. Patients with diabetes are at greater risk of developing other illnesses, including problems in the oral cavity.

**Clinical Implications.** Dentists can educate patients about the risk factors for the disease and measures that can be taken to prevent its onset. For patients diagnosed with diabetes, controlling diabetes-associated complications is essential to effectively managing the condition. Thus, dentists can provide an important service to their patients with diabetes by educating them about the importance of proper oral hygiene, avoiding tobacco use, receiving regular professional care and other key lifestyle goals for helping manage the disease.

beta cells in the pancreas, which make insulin. This type of diabetes used to be called juvenile diabetes because it usually was diagnosed in children, adolescents and adults younger than 20 years of age.<sup>2,3</sup> Researchers are investigating the risk factors for type 1 diabetes

**Dentists can educate patients about the risk factors for diabetes and measures that can be taken to prevent its onset.**

**BOX 1****FOR MORE INFORMATION.**

National Institute of Diabetes and Digestive and Kidney Diseases

National Diabetes Information Clearinghouse  
1 Information Way

Bethesda, Md. 20892-3560

**Phone:** 1-800-860-8747 or 1-301-654-3327

**Web site:** "www.niddk.nih.gov"

**e-mail:** "ndic@info.niddk.nih.gov"

National Diabetes Education Program

**Phone:** 1-800-438-5383

**Web site:** "www.ndep.nih.gov"

National Oral Health  
Information Clearinghouse  
1 NOHIC Way

Bethesda, Md. 20892-3500

**Phone:** 1-302-402-7364

**Web site:** "www.nohic.nidcr.nih.gov"

**e-mail:** "nohic@nidcr.nih.gov"

National Institute of Dental and  
Craniofacial Research  
Diabetes and Oral Health

**Web site:** "www.nidcr.nih.gov/health/  
newsandhealth/diabetes.asp"

American Diabetes Association

**Phone:** 1-800-DIABETES (1-800-342-2383)

**Web site:** "www.cdc.gov/diabetes"

Centers for Disease Control and Prevention

**Phone:** 1-877-232-3422

**Web site:** "www.cdc.gov/diabetes"

beyond family history.

Type 2 diabetes is the most common form of diabetes and accounts for 90 to 95 percent of all people with the disease. Many people with type 2 diabetes can control their diabetes through diet, exercise and weight control without having to take medicine, but some people with type 2 diabetes need to take insulin or other medicine every day. Although type 2 diabetes generally is found in adults, it is increasingly being found in children and adolescents. Before people develop type 2 diabetes, they usually have "prediabetes," a condition in which blood glucose levels are higher than normal but not high enough to be called diabetes. Prediabetes also is called impaired glucose tolerance or impaired fasting glucose.<sup>2,3</sup> This condition can be a warning sign to take action to prevent the disease.

Up to 14 percent of women develop diabetes during pregnancy.<sup>4</sup> This type of diabetes is called gestational diabetes. Women with gestational diabetes have plenty of insulin, but the insulin is

**BOX 2****RISKS FOR TYPE 2 DIABETES.\*****YOU ARE MORE LIKELY TO DEVELOP TYPE 2 DIABETES IF YOU**

- Are overweight
- Are aged 45 years or older
- Have a parent, brother or sister with diabetes
- Are African-American, American Indian, Asian-American, Hispanic American/Latino or a Pacific Islander
- Have had gestational (pregnancy) diabetes or gave birth to at least one baby weighing more than 9 pounds
- Have blood pressure that is 140 millimeters of mercury over 90 mm Hg or higher, or have been told by a health care provider that you have high blood pressure
- Have a good cholesterol level (high-density lipoprotein) that is 35 or lower, or a triglycerides level that is 250 or higher
- Are fairly inactive or exercise fewer than three times per week

\* Source: National Diabetes Information Clearinghouse.<sup>2</sup>

partially blocked by hormones during pregnancy. Although the disease resolves after pregnancy, many women with gestational diabetes develop type 2 diabetes later in life.<sup>3-7</sup>

Additional information about diabetes can be obtained from the organizations listed in Box 1.

**SIGNS AND SYMPTOMS OF DIABETES**

People with all types of diabetes may have one or more of the following signs or symptoms before they find out they have the disease<sup>8</sup>:

- being very thirsty;
- urinating often;
- feeling very hungry or tired;
- losing weight without trying;
- having sores that heal slowly;
- having dry, itchy skin;
- losing feeling in the feet or having tingling in the feet;
- having blurry eyesight.

**KNOW THE RISK FACTORS FOR DIABETES**

Knowing the risk factors for type 2 diabetes can help you take steps toward reducing the risk of developing this type of diabetes.<sup>2,3,9</sup> People with type 2 diabetes often are overweight and generally do not have the first four signs or symptoms listed previously that usually are present in type 1 diabetes.<sup>6</sup> Box 2 lists the risk factors for type 2 diabetes. Being overweight, not exercising, having high blood pressure and having abnormal

cholesterol factors (low levels of high-density lipoproteins or high levels of triglycerides) are risk factors that usually can be controlled.

If you are pregnant, you can learn about your risk of developing gestational diabetes by answering the questions in Box 3. If you can answer “no” to all these questions, you are at low risk of developing gestational diabetes.

### DIABETES-ASSOCIATED COMPLICATIONS

Complications (problems) of both type 1 and 2 diabetes include heart disease, stroke, high blood pressure, eye problems including possible blindness, kidney disease, nervous system damage, foot problems, skin disorders and dental disease. People with diabetes are more likely to develop many other illnesses, and once they get sick, they do not heal as well as other people. Uncontrolled diabetes may lead to spikes in blood sugar levels that can be life-threatening. Poorly controlled diabetes before and during pregnancy can cause birth defects, spontaneous abortion or large babies.<sup>3,10,11</sup>

Diabetes also can cause problems in the mouth. People with diabetes are more likely to develop periodontal infections or gum disease. One early sign of gum disease is bleeding gums after brushing or flossing. If left untreated, gum disease can cause loose teeth or even tooth loss. Smoking makes it even more likely that people with diabetes will have gum disease. People with diabetes also are more likely to develop other problems in the mouth such as infections caused by a fungus, poor wound healing after dental surgery or trauma, oral ulcers, changes in taste and nerve disorders. Some people with diabetes develop a dry mouth that increases their risk of developing tooth decay and other infections.<sup>10-13</sup>

Diabetes-associated complications can be prevented, controlled and treated.<sup>3,10,11,14,15</sup> If you have diabetes, actively manage your disease and take control.

### PREVENTING TYPE 2 DIABETES

All types of diabetes can and should be managed, but type 2 diabetes can be delayed or prevented.<sup>2,9</sup> Several things can be done to decrease the chances of developing type 2 diabetes. Check with your health care provider to find out if you are at risk of developing diabetes or if you have prediabetes. If so, take steps to prevent or delay its onset. When people have a family history of diabetes, regularly scheduled appointments with a physician should include a careful check of blood sugar levels.<sup>2,3,9</sup>

### BOX 3

#### RISK LEVEL FOR GESTATIONAL DIABETES.\*

##### ARE YOU AT RISK OF DEVELOPING GESTATIONAL DIABETES?

- Are you a member of a high-risk ethnic group (Hispanic, African-American, American Indian, South or East Asian, Pacific Islander or indigenous Australian)?
- Are you overweight or very overweight?
- Are you related to anyone who has diabetes now or had diabetes in his or her lifetime?
- Are you older than age 25 years?
- Did you have gestational diabetes with a past pregnancy?
- Have you had a stillbirth or a very large baby with a past pregnancy?

If you answered “yes” to two or more questions, you are at **high risk**.

If you answered “yes” to only one question, you are at **average risk**.

If you answered “no” to all questions, you are at **low risk**.

\* Source: National Institute of Child Health and Human Development.<sup>5</sup>

Lifestyle changes—including weight control, a healthful diet and exercise—can prevent or delay the onset of type 2 diabetes in adults and children at high risk. Research has shown that people at high risk of developing diabetes can prevent or delay the disease by doing 30 minutes of physical activity five days a week and losing 5 to 7 percent of their body weight. Eating a well-balanced diet—avoiding large amounts of sugar, fat and starchy foods and eating a variety of fiber-containing foods such as whole grains, fruits and vegetables—helps trim excess weight and maintain health.

For exercise, start off slowly and work up to a realistic goal. Regular walking, jogging, dancing, swimming, biking or any activity that helps get your heart rate up a bit will help reduce your risk of developing diabetes. Set goals with help from your health care provider and work with him or her, as well as family and friends, to achieve your goals. Watch what you eat and how much you eat, and exercise regularly to lose extra weight and keep it off.<sup>2,3,9</sup> Remember that even modest amounts of physical activity help cut the risk of obesity, high blood pressure and diabetes.<sup>9</sup>

### TAKING CARE OF TYPE 1 OR TYPE 2 DIABETES

Following a healthful diet, controlling weight and exercising regularly help control both type 1 and

type 2 diabetes. In addition, there are a few other things that should be done. Strive to follow the guidelines found in Box 4 every day to keep blood sugar under control. The goal of diabetes management is to safely keep blood glucose levels as close as possible to those of people who do not have diabetes.

To help keep your blood sugar levels under control, it is important that you take your diabetes medicine each day as directed by your physician and contact him or her immediately if you run out of medicine, or if your readings are too high or too low for a few days. Keep a daily record of the times of day and the amounts and kinds of medicine you take.

Check your blood sugar levels frequently. It is easy to check blood sugar several times a day using modern blood glucose meters. Have your glycosylated hemoglobin tested at least twice a year. This test shows what your overall blood glucose level has been for the past two to three months. Your health care provider will order this test for you.

You should not smoke because it can cause heart disease, cancer and lung disease. It is important to remember that smoking slows wound healing and makes it more likely that you will develop advanced gum disease and oral cancer.

Brush and floss your teeth twice a day or more. Be sure to use fluoride toothpaste when you brush your teeth because fluoride is proven to

#### BOX 4

### TAKING CARE OF TYPE 1 AND TYPE 2 DIABETES.\*

#### FOLLOW THESE GUIDELINES TO KEEP BLOOD SUGAR LEVELS UNDER CONTROL:

- Follow the healthful eating plan that you and your health care provider, dietician or nutritionist have set.
- Try to exercise at least 30 minutes each day. Check with your health care provider to see what activities are best for you.
- Take your diabetes medicine as recommended by your health care provider. Keep a daily record of the times of day and the amounts and kinds of medicine you took.
- Check your blood sugar level regularly, as recommended by your health care provider. Keep your blood sugar levels as close to normal as possible. Let your health care provider know if your readings are too high or too low for two or three days.
- Do not smoke.
- Brush and floss your teeth every day and visit your dentist at least twice a year. Tell your dentist if you have diabetes and see your dentist if you have a problem with your teeth or mouth.
- Check your feet each day for cuts, sores, blisters, swelling, redness or sore toenails. Wear shoes that fit well, and dry your feet between the toes after washing. Have your health care provider check your feet at every visit.

\* Sources: National Diabetes Information Clearinghouse<sup>3,8</sup>; U.S. Department of Health and Human Services<sup>11</sup>; Lalla and D'Ambrosio<sup>13</sup>; National Diabetes Education Program.<sup>14,15</sup>

#### BOX 5

### TAKING CARE OF GESTATIONAL DIABETES.\*

#### TREATMENT AIMS TO KEEP BLOOD SUGAR AT LEVELS LIKE THOSE OF WOMEN WITHOUT GESTATIONAL DIABETES:

- Following a proper diet and exercising regularly often keep blood sugar levels in the normal range without the need for medications such as insulin.
- Check with your health care provider to see what exercise activities are best for you.
- Your health care provider also may want you to include daily blood sugar testing and insulin injections to keep your blood sugar levels in the right range.
- As recommended for all pregnant women, avoid alcohol and smoking.
- Work with your health care provider, nurse educator and other members of your health care team to manage your gestational diabetes.
- Brush and floss your teeth daily and check with your dentist early in your pregnancy to help avoid or treat any dental problems.

\* Sources: U.S. Department of Health and Human Services<sup>6,11</sup>; American Diabetes Association.<sup>7</sup>

help prevent tooth decay.

Because diabetes can hurt you and your baby, you need to start treatment promptly after learning that you have gestational diabetes.<sup>5-7</sup> Treatment for gestational diabetes is intended to keep blood glucose at levels like those of women who do not have gestational diabetes.<sup>6,7</sup> Box 5 provides tips on keeping gestational diabetes under control. Sticking with your treatment will result in a healthy pregnancy and birth, and may help your baby avoid future poor health.<sup>5-7</sup>

#### CONCLUSION

Diabetes is diagnosed in more than 1 million

Americans each year. By knowing the risk factors for diabetes, you can determine if you have an elevated risk of developing the disease. Dentists can educate you about measures that can be taken to prevent the development of diabetes. If you have diabetes, dentists can provide information about the importance of proper oral hygiene, avoiding tobacco use, receiving regular professional health care and other key lifestyle goals for helping to manage the disease and control diabetes-associated complications. ■

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