Joslin Diabetes Center

Diabetes and Dental Health—Understanding the Connection

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Introduction

If you are among the 24 million people in the United States who have diabetes, or if you are among the 57 million who are at risk for it, then periodontal disease (PD), particularly how to keep from getting it, is of particular concern to you. This booklet will explain both diabetes and PD and the important connection between them.

What is diabetes?

Glucose is the main source of fuel for the body. It is carried by the blood to the body's cells to be used or stored as energy. Your body needs a hormone called insulin in order to use glucose for energy. Diabetes is a condition in which the body either does not make or does not properly use insulin, causing blood glucose levels to rise too high. Consistently high glucose levels, if not treated, may over time lead to increased inflammation and other changes which, in turn, may cause complications of diabetes such as blindness, heart disease, and gum disease.

Type 1 diabetes is an autoimmune disease that stops the pancreas from making insulin. The body's immune system attacks and destroys the cells of the pancreas that make insulin. Type 2 diabetes, the most common form of diabetes, occurs when the body does not produce enough insulin or cannot use it properly.

Who is at risk for type 2 diabetes?

People who:

- have close relatives with diabetes
- are over 45 years of age
- do not exercise regularly or are overweight
- are African American, American Indian, Native Alaskan, Asian American, Hispanic or Pacific Islander
- developed diabetes only during pregnancy or have delivered a baby weighing over 9 pounds

Common signs of diabetes include:

- unusual tiredness
- increased hunger and thirst
- frequent urination
- unplanned weight loss
- blurry vision
- increase in urinary or yeast infections
- difficulty with wound healing

Diabetes can be diagnosed by a fasting blood glucose test (diabetes is confirmed if blood glucose is equal to or greater than 126 mg/dL) or an oral glucose tolerance test (diabetes is confirmed if blood glucose is equal to or greater than 200 mg/dL).

If you have diabetes, it is most important that you find out from your healthcare provider what your blood glucose target should be and what you need to do to keep your blood in that target range. For most, this range is between 90 and 130 before meals. If your blood glucose levels remain high over many years, health problems may develop. However, if you work with the members of your healthcare team to keep your blood glucose near target, you may be able to prevent or delay the long-term complications of diabetes such as heart disease, strokes, loss of vision, kidney failure, periodontal disease and nerve and blood vessel damage.

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What are periodontal diseases?

Periodontal (gum) diseases include gingivitis and periodontitis, which are chronic bacterial infections that affect the gums and the bone supporting the teeth. They begin with the bacteria in the plaque (the sticky, colorless film that forms on your teeth on a daily basis), which causes the gums to become red and swollen and to bleed easily.

Gingivitis

Gingivitis is the milder form of the disease and is often related to poor oral hygiene. Gingivitis is reversible with good oral home plaque removal and professional treatment. Left untreated, gingivitis can develop into periodontitis. When this happens, dental plaques spread and grow between the gum and tooth and produce poisons or toxins that cause the gums to separate from the teeth and form pockets (spaces between the teeth and gums). These pockets deepen and eventually the bone holding the tooth in the jaw is destroyed. Teeth then become loose and may have to be removed. Periodontal disease is the major cause of tooth loss in adults.

What are the common signs of periodontal disease?

Periodontal diseases are often painless and you may not be aware you have them. On the other hand, many prople do have signs or symptoms of periodontal disease that include:

- bleeding of the gums when brushing or cleaning in between the teeth
- gums pulling away from the teeth making the teeth appear longer
- tender, red or swollen gums
- loose or separating teeth
- persistent bad breath
- change in bite
- change in the fit of partial dentures

Risk factors which increase the likelihood of getting periodontal disease include:

- diabetes (type 1 or type 2)
- smoking cigarettes or cigars
- being overweight
- losing bone (becoming osteoporotic)
- not having enough calcium in the diet
- stress
- genetic factors

How do you know if you have periodontal disease?

Answering the following questions will give you an idea of your chance of having periodontal disease:

1. Do you think you might have gum disease?
   ❒ Yes ❒ No
2. Have you ever had treatment for gum disease, such as scaling and root planing, sometimes called deep cleaning?
   ❒ Yes ❒ No
3. Have any of your teeth become loose on their own without an injury?
   ❒ Yes ❒ No
4. Have you ever been told by a dental professional that you have lost bone around your teeth?
   ❒ Yes ❒ No
5. During the past 3 months, have you noticed a tooth that doesn't look right?
   ❒ Yes ❒ No
6. Do you have diabetes?
   ❒ Yes ❒ No
7. Are you over 50 years of age?
   ❒ Yes ❒ No
8. Overall, how do you rate the health of your teeth and gums?
   ❒ Excellent or Good ❒ Fair or Poor
9. Aside from brushing your teeth with a toothbrush in the last 7 days, how many times did you use dental floss or any other device to clean between your teeth?
   ❒ 3 or more times ❒ 0 times
10. Aside from brushing your teeth with a toothbrush in the last 7 days, how many times did you use mouthwash or other dental rinse products used to treat dental disease or dental problems?
    ❒ 3 or more times ❒ 0 times

If you answered "yes" to 3 or more of these questions, or a combination of "yes" or "0" that totals 3 or more, it is likely that you have periodontal disease. In this case, you should seek dental care.

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The link between diabetes and oral health

Diabetes can lead to changes in the mouth, and can particularly affect the gums and periodontal tissue. People with diabetes who have poor blood glucose control often have severe gingivitis or periodontitis. In fact, people with diabetes are two to three times more likely than people without diabetes to have destructive forms of periodontal disease, often leading to tooth loss. Tooth loss in turn may cause people to eat less healthy foods that contain more fat or sugar and less fiber because such foods are easier to chew.

The effect of periodontal disease on blood glucose

Studies show a two-way connection between diabetes and periodontal disease. While people with diabetes are more susceptible to gingivitis and periodontitis, in addition, those with diabetes who also have periodontal disease find that their blood glucose control is made more difficult. Also, people with diabetes who have periodontal disease have approximately 2-3 times greater risk of heart disease and 5 times greater risk of kidney disease.

Good news

The good news, however, is that proper care of the mouth by preventing or treating periodontal disease may help people with diabetes achieve better blood glucose control. Treatment of periodontal disease decreases the infection and inflammation of the gums and, therefore, contributes to the improvement of blood glucose control by making insulin work more effectively.

What is good oral hygiene?

Everyone must remove the plaque from their teeth and gums every day by brushing and cleaning in between the teeth by flossing or in another manner prescribed by their dentist or hygienist. Regular dental visits are also important. Especially for people with diabetes, professional teeth cleaning at least twice a year is necessary to remove dental plaque and plaques that have calcified (called “tartar”) from places your toothbrush and other cleaning aids may have missed. If you have been treated for periodontal diseases, you may need professional cleanings more often, three or four times per year, since you are at risk of redeveloping periodontal disease.

How is periodontal disease treated if you have diabetes?

If your diabetes is well controlled, periodontal disease will be treated in much the same way as it is for one without diabetes. In the early stages of periodontal disease, treatment usually involves scaling and root planing, a procedure whereby plaque and tartar are removed from the tooth surface and from the deep pockets around the teeth. Your dentist or hygienist will give you suggestions for effectively removing dental plaque each day. Advanced cases of periodontal disease often require further treatment involving surgical procedures; and very advanced cases will involve extractions and possibly replacement of teeth with implants or other prosthetic devices.

Questions to ask your dentist about periodontal disease

It is recommended that you visit your dentist at least twice per year and request that the dentist conduct a complete examination to detect periodontal disease. Often this requires dental x-rays and probing to measure the depth of the periodontal pockets around each tooth.

1. Ask your dentist or hygienist if there are pocket depths of 5 millimeters or more, which usually means there is periodontal disease present.
2. Ask if your oral hygiene is adequate and, if not, how it can be improved.
3. Ask how you can help prevent periodontal disease. Also ask how often you should see the dentist, and what oral hygiene regime is best for you.
4. If you have periodontal disease, ask about treatment options and the side effects of treatment on your oral tissues and your diabetes. Also ask what level of diabetes control you should try to achieve before having extensive periodontal treatment.
5. Ask what steps you should take before having dental procedures in order to prevent low blood glucose or other adverse events associated with diabetes. For example, ask whether you should take your insulin or oral medication on the day of the dental procedure, and about any changes in routine diabetes home care that may be necessary.

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6. Ask about any possible adverse healing events that may occur. Ask the dentist if he or she thinks you are likely to be a slow healer because you have diabetes, and what should be done to ensure adequate healing. Also ask if chewing is going to be difficult after surgery and, if so, what dietary changes will be necessary to maintain good blood glucose control.
7. After periodontal therapy, ask the dentist what he or she can do to prevent periodontal disease from coming back, what other dental procedures are needed, how often you should have your teeth cleaned, and what unique oral cleaning aids you should use after therapy.

Questions to ask your healthcare provider about diabetes

If you have diabetes, it's important to see your healthcare provider regularly and ask the important questions below to be sure that you are doing everything you can to prevent or slow the complications of diabetes.

1. **Ask for an A1C test** (a lab test that shows your average blood glucose over the past 2-3 months). Ask what your A1C results are, what the results mean and what your target A1C should be. For most people a goal is less than 7%.
2. **Ask what your blood pressure is.** Your target should be no more than 130/80. If your blood pressure is higher than 130/80, ask what action you should take.
3. **Ask the results of your LDL cholesterol test.** This test tells you how well your heart and arteries are working. Your target is to have your LDL cholesterol number less than 100. If your results are higher, ask what actions you can take to lower it in order to prevent a heart attack or stroke.

Healthy Eating

Making healthy food choices is important for everyone. However, it is especially important if you have diabetes or are at risk for diabetes – both to help keep your blood glucose in a healthy range and also to prevent periodontal disease. It is important to talk with your healthcare provider and to a dietitian about creating a meal plan just for you that takes into account your food preferences and your lifestyle. If you follow this meal plan, which will tell you how much carbohydrate, protein and fats are best for you to eat at each meal, you will be taking care of your diabetes and your teeth and gums.

Foods like hard candies, sodas and juices, are frequently used to treat low blood glucose reactions (hypoglycemia), however, these foods can produce acids that damage the enamel of the tooth. Saliva neutralizes these acids. Often people with diabetes have a decreased flow of saliva, putting them at higher risk for tooth decay.

Try to avoid foods that are not teeth-friendly

Foods that can hurt your teeth:

- sugary foods
- carbonated beverages
- juices
- acidic foods

Starchy and sugary foods, such as cookies, doughnuts, muffins, chips and crackers adhere or stick to the teeth longer than other foods, and thus pose a greater risk for tooth decay. Eat these high carbohydrate foods with a meal so that the increased saliva production during the meal can help to neutralize acid production and clear food from the mouth. A piece of sugar-free gum at the end of a meal can help combat the acids produced from carbohydrate foods during the meal.

Food combinations that promote oral health

High protein and calcium foods such as lowfat milk, yogurt, cheese and nuts should be included in a healthy diet each day. The calcium and vitamin D help remineralize tooth enamel and prevent erosion. Lowfat cheeses also help to stimulate saliva production and clear away food particles.

Diabetes can boost levels of inflammatory chemicals in the body, which can increase the risk of periodontal disease and heart disease. Key nutrients that can help fight periodontal disease and help with diabetes control are vitamin C, folate and magnesium. Foods that are rich in these nutrients may counteract this effect by enhancing the body's immune response to infection and inflammation. The table on the next page provides a list of food sources rich in these nutrients:

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Nutrients	Food Sources
Vitamin C	Red bell peppers, broccoli, strawberries, citrus fruits
Folate	Lentils, cowpeas, pinto beans, chickpeas, okra, spinach
Magnesium	Whole grains, almonds, spinach, beans
Vitamin D	Salmon, tuna, mackerel, milk, egg, lowfat Swiss cheese
Calcium	Lowfat milk, cheese, yogurt, tofu, soybeans, kale

When you cook (or when you order out) choose grilled, baked, broiled, poached, steamed, roasted or lightly sautéed foods.

Healthy snack choices (in moderate amounts)

You can reduce the exposure of your teeth to acids by eating fewer sweet snacks in between meals and by eating fewer sugary and acidic foods. Rinsing your mouth with water after snacks may also help to remove food particles. When you do want a snack, or if snacking is required for your diabetes treatment or weight loss program, try the following choices:

- a medium apple or pear with 1 tbsp nut butter
- 6 oz light yogurt or low-carb yogurt with 1 tbsp sliced nuts
- 1 wedge lowfat Swiss cheese and 5 pieces of whole grain crackers
- 2 thin slices of lowfat turkey or chicken, 2 tsp light mayo and 1 piece whole grain bread
- 1 cup lowfat cottage cheese with ¾ cup berries
- fresh bell peppers with 2 tsp light mayo or lowfat salad dressing
- 2 oz tuna packed in water, 2 tsp light mayo with a plate of vegetables

If you have severe periodontal disease that affects your ability to chew foods, try the following soft foods:

- Smoothies made from fresh fruits, light juice, milk, frozen yogurt, tofu or nut butter
- Soups – most soups are naturally pureed – choose one that is higher in protein such as bean soups, chicken noodles
- pureed vegetables casserole or vegetable juice
- tofu entrees
- light yogurt, ice cream
- sugar-free pudding
- sugar-free instant breakfast

Remember…

To improve your diabetes health and your dental health, learn to read food labels and choose the healthiest choices, spread carbohydrates throughout your day, and limit portion sizes. And don't forget that good oral hygiene practices are essential to healthy gums and teeth and overall health. Lastly, remember that what is healthy for you is healthy for your family too!

About Joslin Diabetes Center

Joslin Diabetes Center is the world's preeminent diabetes clinic, diabetes research center, and provider of diabetes education.

Founded in 1898, Joslin is an independent, nonprofit institution affiliated with Harvard Medical School. Joslin research is a team of more than 300 people at the forefront of discovery aimed at preventing and curing diabetes. Joslin Clinic is the world's first and most respected diabetes care facility, offering expertise in all facets of diabetes and diabetes complications. The Joslin Clinic is complimented by a nationwide network of Joslin educational programs offered each year to clinicians, researchers and patients. Through these avenues, Joslin develops, implements and shares innovations that immeasurably improve the lives of people with diabetes. For more information about Joslin, call 1-800-JOSLIN-1 or visit www.joslin.org

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