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Can Chewing Affect Blood Glucose for Diabetics?

Analysis by Dr. Joseph Mercola | February 09, 2024

STORY AT-A-GLANCE

- The ability to chew, and how long you do it, appear to affect glucose metabolism, insulin secretion, dietary factors and other elements that influence diabetes risk
- A strong connection was found between the ability to chew and blood glucose levels in 94 patients with Type 2 diabetes
- Subjects who had difficulty chewing, due to tooth loss and other issues, had significantly higher blood sugar levels than those who had full chewing ability
- Among those with good occlusal function — or the ability to chew food thoroughly — blood glucose level was 7.48, as measured by glycated hemoglobin A1c, an average level of blood sugar over the past 60 to 90 days
- Blood glucose was nearly 27% higher, or 9.42, in the group that couldn't chew well — or at all

It's estimated that, by 2050, more than 1.31 billion people worldwide may have diabetes.[1] Lifestyle factors play a key role, but one that's not often considered is mastication, or chewing.

The ability to chew, and how long you do it, appears to affect glucose metabolism, insulin secretion, dietary factors and other elements that influence diabetes risk. Not only does this serve as a reminder to chew your food thoroughly, but if you're unable to chew properly due to missing teeth or other oral health problems, getting to the root of the issue may improve your overall health.

Impaired Chewing Associated With Higher Blood Sugar Levels

A strong connection was found between the ability to chew thoroughly and blood glucose levels in 94 patients with Type 2 diabetes (T2D), according to a study by researchers with the University at Buffalo in New York and Sisli Hamidiye Etfal Education and Research Hospital in Istanbul, Turkey.[2]

In this case, impaired chewing was due to diminished dental occlusion, which refers to your bite, or how your upper and lower teeth come together. Subjects who had difficulty chewing, due to tooth loss and other issues, had significantly higher blood sugar levels than those who had full chewing ability.[3]

Among those with good occlusal function — or the ability to chew food thoroughly — blood glucose level was 7.48, as measured by glycated hemoglobin A1c, an average level of blood sugar over the past 60 to 90 days.[4] This was nearly 27% higher, or 9.42, in the group that couldn't chew well — or at all.[5]

"Our findings show there is a strong association between mastication and controlling blood glucose levels among T2D patients," University at Buffalo researcher Mehmet A. Eskan explained in a news release.[6]

Further, restoring chewing function may improve Type 2 diabetes outcomes. When those who had trouble chewing were treated with an implant-supported fixed restoration, their blood glucose levels dropped from 9.1 to 6.2.[7] A 2020 study co-led by Eskan also found significant benefits when chewing function was restored.[8] According to the University at Buffalo:[9]

> *"A T2D patient whose chewing function was severely impaired by missing teeth presented initially with a blood glucose level of 9.1. The patient obtained nutrition by using a bottle and eating baby food. Four months after treatment with a full mouth implant-supported fixed restoration, the patient's glucose level dropped to 7.8. After 18 months, it decreased to 6.2."*

How Does Trouble Chewing Raise Diabetes Risk?

Chewing, and especially chewing slowly, helps with the mastication-to-digestion process, starting in your mouth. Chewing helps break down your food faster, and saliva, which contains an enzyme called lingual lipase to help break down fats, helps (quite a bit) when you swallow. The longer you chew, the more time those enzymes have to start breaking down your food.

The process makes digestion easier on your stomach and small intestine, because digestion takes a lot of energy. Chewing food thoroughly makes it easier for your intestines to absorb the nutrients in the foods you eat.

For instance, in one study, when participants ate almonds quickly and chewed less (10 times as opposed to 25 times or 40 times per bite), scientists found that their bodies failed to take in all the considerable nutrients almonds have to offer; the bits simply passed through and were eliminated. For those who chewed the most, the particles (hence the nutrition) were absorbed faster.[10]

In the featured study, 40% to 50% of the subjects had so much difficulty chewing that they preferred eating liquid or pureed foods.[11] Such dietary restrictions could lead to reduced nutrient and fiber intake, whereas consuming higher amounts of dietary fiber is linked to a reduced risk of developing Type 2 diabetes.[12]

Chewing Affects Protein Intake, Brain Neurons and More

It's also possible a link exists between histaminic neurons in the brain interacting with the periodontal ligament and the masseter muscle — one of four muscles involved in chewing — to influence blood sugar levels.[13] Reduced protein intake leading to sarcopenia, or age-related muscle loss, is another likely contributor. The researchers explained:

> *"The mechanism between chewing function and masticatory muscle function is a vicious cycle that has not been clearly elucidated. Diminished or lack of*

masticatory capacity can result in reduced dietary protein intake, which could lead to sarcopenia.

Importantly, a reduction in masseter muscle thickness has been observed in patients with sarcopenia, and higher levels of masticatory efficiency were also negatively linked to a low level of sarcopenia."

Building muscle is one of the most important strategies to improve and safeguard your health, especially as you age. You need protein reserves to survive serious disease, and most of your protein is stored in muscle. If you have very little muscle, you're going to pass away prematurely because you have no amino acid reserves.

Your muscle is also a primary regulator of your metabolism. It's a primary site for glucose disposal because of the **GLUT4 insulin receptors** embedded in the muscle cell membranes. These receptors lower your glucose levels after a meal and decrease your risk for diabetes. Your muscle also interfaces with your immune system and helps optimize it.

Chewing even increases glucagon-like peptide 1 (GLP-1). As a peptide hormone, GLP-1 is, among other things, part of a group of incretin hormones, which are released when you eat to regulate insulin, along with many other functions.[14] Along with affecting insulin, GLP-1 may influence the nervous system, leading to an appetite-reducing response.

In fact, the drug semaglutide, known by the brand names Ozempic, Wegovy and Rybelsus, is a glucagon-like peptide 1 receptor agonist (GLP-1RA). It's intended to treat Type 2 diabetes, but it's widely used off-label for weight loss. According to the featured study:[15]

"Interestingly, GLP-1 receptor agonists have been recently shown not only in reducing the level of A1c levels but also reduce the risk of stroke, all-cause mortality death, and cardiovascular disease. The production of GLP-1 was increased in subjects chewing 30-time per bite.

> *Therefore, it is plausible that reduced chewing duration, such as open bite situation, could result in reduced insulin secretion or insufficient signal to the satiety center and/or intestinal tissues to control directly or indirectly blood glucose levels as mentioned above. Together, it is clear that oral health with proper dental occlusion plays a crucial role in maintaining general systemic health."*

Chewing in the morning may also be a useful tool to for enhancing glucose metabolism after eating, even in young, healthy people. After a meal of rice, chewing 40 times in the morning significantly increased insulin secretion after 30 minutes, a finding that "may aid in reducing the incidence of obesity and type 2 diabetes mellitus."[16]

Eating Too Fast Is Bad for Your Metabolic Health

Chewing thoroughly naturally slows down the speed at which you eat. This is another factor that protects your metabolic health, as eating quickly increases the risk of metabolic syndrome, a significant risk factor for Type 2 diabetes.

Cardiologist Takayuki Yamaji from Hiroshima University in Japan was the lead author of one such study, which involved 1,083 generally healthy male and female participants over a period of five years, the average participant being around 51 years of age.[17] Study subjects were divided into three groups, each categorizing themselves as slow, normal or fast eaters.

Over the five years, 84 of the participants developed metabolic syndrome. The result: Your cardiometabolic health could suffer serious harm if you gobble down your food too fast.

"The incidence rates of metabolic syndrome among slow, normal and fast-eating participants were 2.3%, 6.5% and 11.6%, respectively," the researchers said, adding, "Eating speed was associated with obesity and future prevalence of metabolic syndrome. Eating slowly may therefore … be a crucial lifestyle factor for preventing metabolic syndrome among the Japanese."[18]

Other research has come to similar findings, including a cross-sectional study on the association between mastication and diabetes, which found fast eating was a possible risk factor for the development of diabetes. Further, the team noted "[S]low eating and preservation of high masticatory performance by the prevention of tooth loss or maintenance of dental prosthesis might prevent the occurrence of diabetes."[19]

Protecting Your Oral Health Reduces Diabetes Risk

Maintaining the ability to chew your food well relies on good oral health throughout your life. But among adults aged 30 or over, 46% have signs of gum disease, while 9% of adults have severe gum disease.[20] Many aren't aware they have it, however, as gum disease is often a "silent" condition, not showing signs and symptoms until more advanced stages.[21]

In the initial stage of gingivitis, you may notice that your gums bleed when you brush your teeth, floss or eat hard food. Your gums may also be red or swollen. As the disease progresses, it can lead to tooth loss and systemic inflammation, increasing your risk of diabetes and other chronic health conditions.[22]

Proper oral hygiene, including regular brushing, flossing and tongue scraping, and getting regular cleanings with a mercury-free biological dentist, will help keep your teeth and gums healthy. A lifestyle that includes a diet based on fresh, whole foods is also essential to a naturally clean mouth and good oral health.

For extra care, **try oil pulling** using coconut oil. Coconut oil is antibacterial and antiviral, and oil pulling has been found to reduce gingivitis and plaque, significantly lowering plaque index scores compared to a control group, while also reducing bacterial colony counts in saliva.[23]

Among people with diabetes, coconut oil pulling was found to help resolve inflammation and prevent further progression of gingivitis,[24] which could help save your teeth and protect your ability to chew.

To try it, take a small amount of the oil and swish it around your mouth, "pulling" it between your teeth and ensuring it moves around your entire mouth. After about 20 minutes, spit the oil out into the garbage. You can use oil pulling daily along with regular brushing and flossing.

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