

EPISODE 38: Dental Health and Diabetes

Dr. Rita Kalyani, MD: Welcome to **Diabetes Deconstructed**, a podcast for people interested in learning more about diabetes. I'm your host, Dr. Rita Kalyani at Johns Hopkins. We developed this podcast as a companion to our Patient Guide to Diabetes website. If you want a trusted and easy to understand resource for diabetes or to listen to previous podcasts, please visit hopkinsdiabetesinfo.org.

Today, we are pleased to welcome Dr. Karl Zeren, who will be educating us on diabetes and periodontal disease. Dr. Zeren received undergraduate and dental training from the University of Maryland. He served on active duty in the U. S. Navy at the Navy Hospital in New Orleans, Louisiana, and completed postdoctoral training in periodontics at the University of Maryland in 1979. He's a former assistant clinical professor of periodontics in the periodontal and periodontal implant prosthetics residency program at the University of Maryland School of Dentistry and retired as a Clinical Associate in the Department of Otolaryngology at the Johns Hopkins University School of Medicine.

He has lectured extensively on guided bone regeneration, implant surgery, implant aesthetics, and 3D imaging, both nationally and internationally. He currently works in private practice, West Perio, in Maryland. Welcome Dr. Zeren.

Dr. Karl Zeren, DDS : Thank you very much, Rita. I appreciate the opportunity to speak with you and share some information.

RK: We are excited, Dr. Zeren, to have you here on the podcast today and to learn about this important issue and condition that can affect people and particularly people with diabetes. I wonder if you could start off by telling us: What is periodontal disease? What are some common signs and symptoms that individuals should be aware of?

KZ: Rita, it's really interesting because it's one of the most common, if not the most common disease known to man. It's there. It is in fact an inflammatory disease, and it's triggered by the natural germ population that occupies the oral cavity. The oral cavity is typically going to harbor about 100 plus billion bacteria at any one point in time, which is normal. The bacterial population creates a film – it's a biofilm – and it's important that people understand that bacteria in their mouth is not necessarily bad – it's essential.

We live in a sea of bacteria and viruses; mother nature has given this film as a source of protection. The real issue is when this germ film has a chance to over accumulate on the tooth surface. The tooth surface has a little bit of electrostatic charge on it that allows the germ film to adhere. When that starts to overgrow, particularly right around the gum line, it's going to trigger inflammation. That's called gingivitis. As long as the inflammation resides solely in the soft tissue, then it's a reversible process. The problem is that when it's allowed to continue. It can extend down into the supporting structures, down into the ligaments that holds the tooth into the bone, and the bone itself. That's when the problems really start, and the issue is, early on, it doesn't hurt. And many patients will say, "Dr. Zeren, it doesn't hurt, why should I worry about it?" Obviously, there are an awful lot of medical conditions that don't hurt until it's too late. That's realistically what we get down to. Early diagnosis of this problem is important. Patients should be aware that if their gums become red and swollen and bleed, this can really be a problem. And as this disease progresses, the teeth can get loose and literally fall out. And all along this process of disease development is allowing these toxins produced by the different bacteria to get into the bloodstream. And this is really when you start to see other issues. There's a very clear relationship between the increase in endotoxin, the exotoxin into the bloodstream, increasing the risk for heart attack and stroke. And certainly in patients who are diabetic, it creates even more of a challenge.

RK: Wow. That's interesting. It sounds pretty complex when you break it down in that way. Just to reiterate some of the things you said, it sounds like bacteria is normal in the oral cavity, the mouth, the esophagus. It sounds like it's needed to digest food. Is that right?

And what we're talking about is when there's an abnormal growth or an overgrowth in parts of the mouth and other parts of the oral cavity where it shouldn't be, such as the bones and the teeth and where it can really cause problems. But what about the gums? I think part of what confuses me sometimes is the distinction between gingivitis or inflammation of the gums and periodontal disease. Are they the same or are they different?

KZ: Periodontal disease is the overreaching of disease, just like diabetes is the overreaching and you break that down into multiple subcategories. Periodontal disease incorporates gingivitis periodontitis. Again, gingivitis is inflammation of the gum tissue itself. If the bacterial challenge is sufficient, then it can break down the natural seal between the tooth and gum. There's a relationship between tooth and gum, somewhat like that between fingernail and cuticle. When the bacterial challenge occurs you have to, first of all, have a susceptible host. But, when that occurs, it's going to get into those underlying tissues and start to destroy those tissues. But having said that, I think it's important to understand that about 53 percent of the population is not genetically prone to bone loss, although they can have significant inflammation in the tissues, the tooth decay and things of that nature, you're not going to lose bone. This really gets down to how they're immunologically programmed. In about 47 percent of the population, you're going to see a broad spectrum of vulnerability.

Everybody has a large germ population in their mouths. But that does not necessarily mean that person's going to lose bone, and that's important. So, there's this whole genetic component to this as well.

It's a very common disease. And I think that when we start to look at the impact, based on some of the research I've done, about 38 million people of all ages in the United States have diabetes. And again, it's a very common problem as you well know.

RK: I think it's potentially one that most people don't pay attention to in terms of you have the bacteria in your mouth. You have this germ film, like you talked about, but it sounds like when there's an overgrowth, when there's too much of that, and in those people who are particularly susceptible, such as those who have genetic factors, like you said, or perhaps other conditions such as diabetes, as we'll talk about, that they might be more at risk for the complications, particularly the bone complications in the teeth. What causes this overgrowth? And perhaps that's the million dollar question. But, why does it happen that some people might have overgrowth of this natural germ fill in their mouth and the old cavity that puts them at risk for these periodontal complications?

KZ: As I said earlier, we're all going to harbor this germ population. The real issue is whether the individual understands what they need to do to control this germ film and, in fact, does it. As a clinician, we know that we can educate patients, advise them, and things of that nature, but they also have to get on board with their own personal care. In patients who are genetically prone to periodontal infection, or bone loss. If they're adequately treated, if they're brushing effectively, flossing effectively, using antiseptic mouth rinses, [that] can slow down the rate at which the germ film can reorganize. Then they can get into a maintainable state. But this germ film is constantly growing and that's really the issue. And it requires daily management.

RK: It certainly sounds like this is something that needs to be maintained and given attention to on a regular, if not daily basis. Turning to people with diabetes, if we could just talk a little bit about the risk in people with diabetes. Do people with diabetes have a higher risk of gum or periodontal disease and how high really is that? Is it higher in people with uncontrolled blood sugars [or] on particular medications? What do you usually tell your patients?

KZ: There's no doubt that diabetes is going to impact periodontal disease. There's a very clear relationship between a patient, their glucose level, or hyperglycemia, and the degree of inflammation that we see in the oral cavity. Research clearly shows that in that population, when you control the germ film effectively, then the patient's glycemic control improves markedly.

There's a very definite correlation between the two of them. When you have this increased glycemia, as you certainly appreciate. It's going to reduce blood flow in vessels and things of that nature. It's going to begin to alter how the immune system is able to function. It weakens the immune system and patients that have periodontitis they are threefold greater risk in patients that have diabetes. There are really significant issues that go into that. But ultimately there is a very significant relationship between the two and just management's important.

RK: That's interesting to hear the bidirectionality, that it can go both ways. From what I understand, from what you said, that people with diabetes can be at higher risk of developing these periodontal, these gum conditions. But also by managing effectively the dental health, the periodontal health and preventing this from happening, it could contribute to improved diabetes management. Is that right?

KZ: [It] absolutely does, and research clearly shows that there's a direct correlation - one to the other. We understand that if there's hyperglycemia, there's going to be a lot more glucose in the saliva. That opens the door for the bacterial populations to be even more overgrown. So, you create a better micro-nutritional base for this bacteria. We then realized that from an immunologic point of view, the system is just not as competent. From a vascular point of view, you're not going to get the same blood flow. You're just creating this perfect storm.

RK: It certainly does sound like it can be a vicious cycle that really needs to be broken in order to effectively manage not only the periodontal conditions, but also to manage the diabetes as well. What about diet? Do you think that what we eat can impact our risk of periodontal disease? And do you think this has bearing on people with diabetes in terms of what we should recommend for food?

KZ: Obviously a patient who's diabetic needs to really be aware of their carbohydrate intake. And when we look most immediately in the oral cavity, if people are snacking on really dense carbohydrates, they tend to help accumulate on the tooth structure which opens the door for even more issues.

A healthy diet, people look at that's rich with fruits and vegetables, very important all the way around. I think that diet probably is going to impact diabetes more than the oral cavity as long as there's not a lot, again, carbohydrates, sugars don't help out a lot. But no, interestingly people will say, "If I eat a candy bar, do I have to go brush my teeth?" and the answer is - "No." You've got to control the germ film, and the germ film is constantly cycling. If you have adequate hygiene

and you're performing that effectively on a daily basis, then the germ film's not really given the opportunity to significantly overgrow and start this whole process.

But it is the day-to-day effective hygiene that's important. And oftentimes, in my experience, I've been in practice for over 40 years, patients oftentimes, do not know:

1. That they've got a problem.
2. Really how to manage it.

I'll ask people, "who taught you to brush your teeth?"- "I guess my mom did, or my dad," or this or that. And they'll observe a behavior and carry it out, and assuming, because they're performing the behavior, it's effective. And oftentimes, it's flatly not. Okay. Being in the hands of a really good dental professional who's looking at how effective you are with your day to day hygiene is really essential.

And coupled with that, is how to identify that subset of the population. Again, coming back to the fact that 53 percent of the population is really not at risk to lose bone. But it's in that other 47%. And those are the people that really need to be educated more and more about these kinds of things.

Diet being one thing, but smoking is terrible when it comes to dealing with periodontal problems. We look at an increased risk of disease not being two or three times, but as much as five to 10 times greater risk because of that impact. And if you are diabetic on top of it; you're in trouble.

RK: It certainly does seem that, as we see with other conditions, such as heart disease, the combination of diabetes and smoking can elevate the risk of these gum and tooth issues. The periodontal disease that you talked about. What are some signs and symptoms that people might be aware of? Or is this largely silent in the early stages? I know we talked briefly about teeth falling out, which seems like a kind of a later stage. But what might be some early signs and symptoms, if at all, that someone with diabetes should be familiar with?

KZ: Again, from an immunologic point of view, their system's not going to be as competent. It's not going to be as responsive. Even with a lesser degree of germ overgrowth, we're likely to see the tissues swelling. We're likely to see bleeding when they're brushing their teeth. Those are very early, very solid indicators of a problem. And as you appreciate, there are a lot of people, from my research, about 7 million people, who have diabetes, don't even know it.

And I've certainly seen patients when you track people over a long period of time and stability and all of a sudden that stability is gone. And you ask them, "Have you had a recent physical? Have you talked to your physician about diabetes or anything else going on?"

"No, I don't want to go do that." Then you start to see significant bleeding. You start to see abscess formation, purulent, pus, drainage around teeth. That's a real trigger. And I've certainly, referred patients to their physicians and they come back. Yep, you're diabetic. It's there.

And for people who are questioning this, certainly if they're starting to see bleeding when they're brushing their teeth or flossing, then that means that's not it. They're not in control of the situation and they need to seek professional care.

RK: That's interesting. And it's true that in some cases, perhaps it's the dentist or the person who examines your teeth that is the first to detect signs of periodontal disease. And perhaps that could, in some cases, be the first sign of underlying metabolic disease or diabetes. Have you detected individuals in your practice in that way, who didn't know they had diabetes and the first manifestation or one of the early manifestations was periodontal disease?

KZ: [I] absolutely have. And studies coming out of Columbia indicate that dentists, in a very large majority of the time, helped to identify these early signs and get people on the road to getting these things managed.

So absolutely, it's important to have that, but what should a patient expect from their dentist at the same time? The world's getting busier and unfortunately, less time is spent in focused care. Management. They should have a clinical examination that would include probing depths. And if probing depths are normal, then they're going to range maybe one to three millimeters and there would not be any bleeding. But if the probing depths are going four or five and six millimeters and there's bleeding, then you have a susceptible host. All right? If the patient's day-to-day hygiene appears to be adequate. Meaning that you're not seeing a lot of accumulation of plaque or calculus and you're still seeing this increased probing depth, then immunologically something else is going on here and that's when you start to really think about diabetes as a conspirator in this problem.

RK: Yeah, getting back a little bit to what we were saying about, sometimes diabetes may be detected for the first time in dental practices. It is interesting that in our clinical guidelines, even for diabetes management, there are guidelines talking about that utility of screening for diabetes in different health care settings such as dental practices. Because most people do or should go see their dentist at a recommended frequency per year, and that could sometimes be even more frequent than they see their primary care doctor, unfortunately, in some situations.

For sure, I think any health care provider really being vigilant and on the alert for complications from diabetes, can sometimes be the first to help bring attention to the diagnosis. You mentioned some aspects of the dental examination that might be part of a comprehensive dental exam that someone could experience when they see their dentist. What are the preventative measures that are usually recommended for people with diabetes, in terms of how often they should be seeing a dentist?

You talked a little bit about what they should expect from their dental exam in terms of probing depth. I wonder if you could. Maybe give some details on what that is. Is that how receded the gums are? And then, how often and how should they be brushing their teeth? I think that's a big question I hear from my patients often too, and I'd love to hear your thoughts on that.

KZ: Rita, it's a really important question that you just posed. And in looking at the diabetic patient, the first thing we want to determine is: Are they also genetically prone to periodontitis? And I've seen plenty of insulin dependent diabetic patients who have adequate oral hygiene and don't show any real signs of breaking down. We need to separate out people who are genetically, not prone to periodontitis, and have diabetes versus those patients who are genetically prone to periodontitis and have diabetes. So that's a really important point to understand.

In terms of what they do, brushing and flossing on a day-to-day basis is essential. Having effective examination, this is really key for people. Making sure that they are getting probing depths, their evaluation of the degree of inflammation that is present from one visit to another is important. So, if we start to see an increased level of inflammatory change from one visit to another, that would suggest that we don't have stability. In terms of brushing and flossing, using an electric toothbrush is very helpful. I'll ask patients, again, like we said, "How often do you brush your teeth" and "I brush once a day, I brush twice a day, I brush four times a day." It's not much a function of how often you do it- it's how well you do it. And that's really an important consideration. Again, "Who taught you to brush your teeth?" Is another key question. People should rely on their dental hygienists to coach them on how to effectively brush and floss. And as long as they're doing that effectively, underlying that word effective, then they're controlling the underlying etiology. And the more that we can control that etiology, the less opportunity these other complicating factors have to impact.

RK: So that's interesting because often people will ask, "Should I brush after every meal? Do I need to bring my toothbrush to work with me?" And from what I'm hearing, clearly it can only help, perhaps, to brush more often, but more importantly, it's the quality of brushing from what you're talking about. Is that right?

KZ: Yeah. Interestingly enough, this whole idea of having to brush your teeth after every meal and see a dentist every six months comes from a toothpaste commercial produced in the 1930s. *Ipana toothpaste*, as a matter of fact. The goal of that commercial was to get people to squirt more toothpaste on a toothbrush and they imply that the food that you eat causes dental disease. It's important to understand that if you're brushing effectively, then for the vast majority of people, once in a 24-hour period is sufficient; number one. Number two; the food that you eat in general does not cause dental disease. It's the germ overgrowth, tooth decay, and periodontal disease that are triggered by that germ overgrowth. And I think that's really essential. You don't need to take a toothbrush to work with you. Okay, if you brush in the morning, at nighttime brush and floss at some point. Also very simply understanding that we've got this large germ population, if you can rinse with an oral antiseptic, *Crest* has one, *Listerine* has one that says antiseptic on it, then if you're rinsing with that, a couple of times a day for 20 seconds or so, you're simply slowing down the rate at which that germ film can reorganize itself. These are the very simple things that people can do to help control the environment and its environmental control.

RK: That seems to be such an important point that really, if you are brushing adequately in the morning and evening, doing the antiseptic, doing the flossing, that it sounds like your germ film should be adequately controlled. If you're doing it optimally throughout the day then you don't have to brush after every time you eat. Is that right?

KZ: Correct. Yes. And people who brush after every meal tend to cause a lot of gum tissue recession. They're causing harm to themselves. And typically, if they're using a manual toothbrush, they go into ritualistic behavior. They start carrying out a behavior and they're not really thinking about what they're doing. They assume because they've got a toothbrush in their mouth, that it's controlling the germ film and oftentimes it's not the case. **RK:** [It seems] to be another example where too much of one thing may not be a good thing. And it's important to know how to do the proper technique.

What do you tell your patients about the proper brushing technique? How long should we be brushing at a time? And should we be angling it in a certain way? Should we be covering the teeth in a certain way? Are there some general principles that you could share?

KZ: Absolutely. And obviously this has been, this has evolved over a century of time with different people suggesting that you should angle the brush in one way or another, and you should do X number of strokes and things. The most effective single thing you can do is to begin using an electric toothbrush. These modern electric toothbrushes have pressure sensors in them, giving you immediate feedback. Some of them in fact have apps that will help you to understand where you did and did not clean effectively. But using an electric toothbrush and allocating 2-3 minutes a day with that brush carefully going around your teeth is exactly what you want to try to accomplish. Often times people will rely on looking in a mirror and assuming that they're translating an effective activity and it's not necessarily the case. Interestingly, if a person simply sits down on the bedside or a chair and focuses on where they are in their mouth and what they're doing with that brush, they'll tend to be imminently more effective in controlling the germ film. But it's a new behavior. That's one of the behaviors that we constantly are coaching people to incorporate and as they do, they all will often remark, "I just can't believe how much cleaner my mouth feels as a result." These are very simple things, but we have to break-up old habits that are full of assumption and not effect.

RK: Yeah. That seems like a relatively simple thing to do, to have a mirror as you're talking about to brush your teeth and but could have profound benefit is what is what I'm hearing. Is that right?

KZ: Absolutely. It's controlling the etiology. You're controlling the underlying causes. And as you appreciate, the more effective you are in controlling etiology, more effective you are in helping to maintain health.

RK: For sure, I fully agree. For those listeners who may not have an electric toothbrush, let's say, for lack of a better word, an old school toothbrush that you don't plug in. Could you still get adequate dental hygiene that way? Would you have to brush longer? Are there certain kinds of bristles you recommend? What do you usually tell your patients?

KZ: That's a really important question. Certainly, a manual toothbrush can provide very adequate debridement or disruption of the germ film. You want to use soft bristles. People oftentimes will hold a toothbrush, like a hockey stick or a screwdriver and just whale on themselves, and that's not really helpful at all. Holding the brush in your fingers and consistently and lightly going over the same areas in a routine fashion is very effective. It's very effective but certainly steer clear of a hard bristle brush because that can cause a tremendous amount of damage. And again, if the individual has the opportunity to incorporate an effective antiseptic rinse, it's again, just giving them another layer of control.

RK: And we're talking about with a soft bristle brush, a light rotating motion, or is there a particular motion you recommend in brushing the teeth?

KZ: [There are] a lot of philosophies on that, but I think an overlapping stroke with gentle pressure and, allowing literally 30 seconds to go from ear to ear on the outside and ear to ear on the inside in each arch. You're going to end up maybe brushing for two minutes and just do it lightly and in that kind of a stroke, as long as it's overlapping. That way you're much more effective in dispersing the germ film. You're not getting rid of it. You're simply trying to disperse it.

RK: That's an interesting point and the overlapping aspect as well. It sounds it could be rotational, it could be angular, it could be back and forth, as long as it's overlapping. Is that right?

KZ: Yes.

RK: That's great to know because for some individuals, they might prefer to do it one way or another. It's good to know that there's many different ways to achieve the same outcome, which is improved dental health. One of the things we talked about was how often people with diabetes should see their dentist. You made the important distinction between those people with diabetes who might be more genetically prone to have dental disease versus those that are not as high risk. For the general person with diabetes, just the general population; how often should they be seeing their dentist? Clearly those who are at higher risk might go more often.

KZ: Yep. Again we talked about this, commercial suggesting that a person should be seen every six months. That's again, marketing. If we have a patient who is genetically prone and they're diabetic, they probably should be seen three or four times a year. Cleaning procedures for those people should take about an hour. If they're going in and they're getting their teeth cleaned in 15 minutes, it's grossly inadequate.

It's important that our population understands that health care is changing a lot of the amount of time that people are allocated for professional care seems to be changing a lot. And it's important that people who are at risk realize that they need a more specific kind of care. And if patients are really questioning whether they're getting adequate care, then they may very well want to seek treatment by a periodontist. And, by training these individuals are much more focused on all of these kinds of risk factors and have a much deeper appreciation for the perio-systemic link here. We talk about diabetes, but people who have significant periodontal disease are also at greater risk for heart attack and stroke because of the inflammatory burden that it provokes.

RK: That's interesting. For those who are at higher risk genetic risk of having periodontal disease, three to four times really intense one-hour sessions. And in addition to seeing their general dentist, seeing a periodontal specialist, such as yourself, might be beneficial. Is that right?

KZ: Yeah. If a person, if their general dentist, is indicating an increase in inflammation and probing depth. Then it would be prudent for that patient to seek management by a periodontist.

RK: And then for the general population of people with diabetes, who may, let's say have average risk or just not a high risk, seeing their dentist twice a year, for 15 to 30 minute sessions. is adequate?

KZ: Generally not. What happens under those circumstances is that somebody is simply using a polishing cup and not really going below the gum line. You've raised a really good point. The biofilm is going to cause pocketing around the tooth. We use the analogy of fingernail and cuticle: when that seal is broken, bacterial populations are getting deeper and deeper into those tissues. And it really does require debridement or cleaning down below the gum line, either with hand instrumentation or ultrasonic instrumentation to clear that out. Simply polishing at the gum line itself is completely ineffective.

RK: It sounds like even for the general population of people with diabetes, it also requires more than just polishing. Really looking to see if there's any pockets and more than, how long would you say they should expect a dental visit to last, if they have an adequate exam?

KZ: A minimum of 45 minutes. Unfortunately, insurance nowadays doesn't afford people the opportunity to do that. But again, making sure that the population is aware of what these risk factors are and things that they can do to minimize their risk or mitigate these problems is essential. It's really an emotional roller coaster for patients who have diabetes and periodontal disease and see them losing teeth and saying, "Can't somebody help me?" The answer is "Absolutely," but it has to go, outside the norm of normal dental treatment.

RK: And, specialists, such as yourself, are critical to helping people who have that advanced stage of periodontal disease. You mentioned some of the complications, which I think are important to emphasize, that it's not just the periodontal disease and diabetes, but the higher risk of cardiovascular disease, other inflammatory conditions. What other complications can people see beyond the oral cavity because of this periodontal disease?

KZ: As we see inflammation and bone damage occurring, it becomes a two way street. The blood vessels around these areas of inflammation open up that immune cells can come in and try to battle. Once those portals and vessels open up, the endotoxins and the bacteria themselves can go into the bloodstream and literally shower the system with these toxins. We clearly have been able to identify atheromatous plaques in heart disease that harbor specific bacteria, particularly *P. gingivalis*. And they can go in and biopsy these things and find living bacteria in these atheromas. We can see the same thing occurring in the brain and apparently has some impact or increased risk for stroke and potentially Alzheimer's. So, it's the bacterial overgrowth in the oral cavity [that] creates an inflammatory burden. The important thing to understand is that in general, with effective treatment, we can control that inflammatory burden and take that portion of it off the table.

RK: It's important to know that if left untreated, that the periodontal disease, the inflammation associated with it can travel beyond the mouth and the oral cavity to the brain, the heart, and really lead to complications there as well. [It]really underscores the importance of addressing this or preventing it from an early stage. One of the questions that I get from my patients, and I think perhaps some of our listeners might have is, "If I have diabetes, am I at a higher risk for having cavities?"

KZ: Yes. As we discussed earlier, particularly in the patient who's not as compliant as we would like to see them. There's going to be more of hyperglycemia that's going to, again, create more of a micro nutritional base in the oral cavity, and that opens up the door for tooth decay. Diabetes also can decrease salivary flow. And as a result opens the door for tooth decay. Those are very definite factors that come into play, and clearly patients who are diabetic should be much more alert to their dental health overall.

RK: I think that is the important point that all of these conditions that we're talking about really related to the teeth and gums are at a higher frequency in people with diabetes. They're more likely to develop them. And really, this relies on the person with diabetes being more vigilant about their dental health, perhaps compared to people who don't have diabetes.

Now, for those people who, despite preventative measures or because of lack of preventative measures or because they're at higher risk, do develop periodontal disease, how is this usually treated? When you see someone in your practice, and clearly this will depend on what they come to see you for, but in general, is it medication? Is it surgery? What is usually the treatment for periodontal disease?

KZ: First and foremost, control the cause. When we're dealing with dental issues, controlling the germ film is essential, which gets down ultimately to very effective oral hygiene. Once we've been able to develop that kind of behavioral pattern, we can do different kinds of procedures to clear out the germ film from below the gum line. Sometimes it's as simple as a process called scaling and root planing. Noting that as the disease progresses down the root of a tooth, the root surface itself becomes toxic, and that root surface needs to be cleaned. There are times when we can intervene with laser therapy to detoxify the root surface, sterilize the root surface, the bone, and the gum tissue at the same time. And depending on how involved or progressed this disease becomes, surgical intervention is oftentimes necessary. But to that same point, a patient is diabetic; they typically don't heal as well. You don't have the same blood supply as you'd like in a non-diabetic patient.

They don't heal as well and they heal slower. These are factors that come into play as well. Again, it's your point that patients who are diabetic should be much more vigilant about their oral health.

RK: In particular to prevent these complications from happening, as you mentioned. And by the time perhaps that you see patients in your clinic, it might be too late in some cases, is that right? Some of the complications may require a surgical intervention?

KZ: That's absolutely true. Not only that, but there, there are plenty of times when the disease has progressed far that you have to take the teeth out. That's debilitating from a lot of different directions. People who can't chew end up selecting a more dense carbohydrate diet. And if they're diabetic, it makes it even worse. The inability to effectively chew to select [a] diet that is healthy also becomes a secondary component to this process.

RK: I think that's so important to really keep in mind, that if not prevented, if not managed, if not treated appropriately, that there can be complications and surgery ultimately to remove teeth that can have significant consequences on day-to-day physical function and also quality of life. I think [it] further underscores the importance of proper dental hygiene and really being aware and vigilant about this potential condition that occurs more frequently in people with diabetes.

Dr. Zeren, we've learned much today from your expertise and really it's been such a great discussion to really understand better why paying attention to our teeth and gums is so important, especially in a person with diabetes.

For those who are listening today, I wonder if you might have some parting words for them. In terms of, if they're encouraged or inspired to really take better management of their dental hygiene, what would be the next steps that you would recommend for them?

KZ: Certainly, just having this kind of information is very helpful for them. Assuming that they're diabetic, they should talk to their dental professional about the kinds of treatments that are necessary; tracking of inflammation in their mouths; bleeding; any increased in probing depth, these kinds of things people should be aware of and should frankly be asking their dental professionals about.

RK: I think that it's important for the awareness that you have shared with us today and having that knowledge to bring it up to their primary care doctors and also their dentists is important. Dr. Zeren, thank you so much for your expertise and sharing all the great knowledge that you have shared with us today. I know that I've learned so much and I have no doubt that our listeners have as well. And hopefully we'll be inspired to really take good care of their teeth and prevent these complications from occurring. Thank you again for being with us.

KZ: It's been my pleasure. I really appreciate the opportunity, thank you.

RK: I'm Dr. Rita Kalyani, and you've been listening to **Diabetes Deconstructed**. We developed this podcast as a companion to our Patient Guide to Diabetes website. Our vision is to provide a trusted and reliable resource based on the latest evidence that people affected by diabetes can use to live healthier lives.

For more information, visit hopkinsdiabetesinfo.org.

We love to hear from our listeners. The email address is hopkinsdiabetesinfo@jhmi.edu.

Thanks for listening. Be well and see you next time.