

Nutrition Support for Athletes with Diabetes

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Hello, everyone. My name is Dr. Noah Emanuel. I'm a sports chiropractic fellow at Northwestern Health Sciences University's Human Performance Center. And my emphasis for my fellowship is sports nutrition. So today, you guys get the privilege of listening to Nutritional Support for Athletes with Diabetes. What we're going to go over in this lecture is we're just gonna review what diabetes mellitus is. I'm going to talk about some things that you should identify if you have an athlete that comes in with diabetes and what the current literature has to say about that. I'm going to go over a case study of one of my athletes.


So to start us off, type 1 diabetes. What it is is it's an autoimmune issue where the pancreatic beta cells are destroyed within the pancreas. So what does this mean? That individual is not producing insulin. They have a relative to absolute insulin deficiency. So these are going to be your individuals or your athletes that have to take insulin therapy or exogenous insulin. They may have a pump or they may not. But these are the ones that need insulin to survive.

Type 2 diabetes mellitus, this is more where the athlete or that individual with type 2 is going to be insulin resistant. So their body doesn't use the insulin very well that they are creating, hence they're insulin resistant not insulin sensitive. Our goal is we want individuals to be insulin sensitive. So with these individuals, you're going to see a progressive loss of insulin secretion over time. But again, the main thing is they just do not use the insulin well. Some of them in serious cases may require exogenous insulin. But most of the time, it's not necessary.

You can manage type 2 diabetes really, really well with proper lifestyle changes and proper diet changes. Also it is linked with metabolic syndrome. And so as most of you probably know, metabolic syndrome is a cluster of conditions where an individual is going to have increased blood pressure, high blood sugars, hence one of the symptoms for diabetes, excess body fat around the waist, abnormal cholesterol or triglyceride levels. And so this just increases their risk of heart disease, stroke, and obviously, diabetes.

So as you can see, this person is typically not in shape and typically doesn't take good care of their body. However, you may run into athletes with type 2 diabetes. I have some right now. It's not that they're out of shape. But there's just some lifestyle changes that we made and some quick diet tweaks that we made that really helped them out. And we will go over that at the end of this lecture.

Here is the diagnosing criteria for diabetes. This is what the American Diabetes Association uses. And it's their most recent one. So that first column is the fasting plasma glucose test. And so an individual is going to fast for eight hours or more. And then we're going to draw their blood to see what their blood glucose levels are. And so we want that below 126 milligrams per deciliter.



The second column that you see is a two hour plasma glucose test. And so basically, someone goes in. And they drink a-- they call it a glucose cola where they ingest 75 grams of just straight glucose. And then two hours later, they test them. And we want to make sure that their blood glucose levels are below 200 milligrams per deciliter.

The last one-- and this one you're going to hear more commonly-- is your A1c level. So this is kind of the golden number that diabetics shoot for for knowing how well their diabetes is being managed. And so with that A1c, we want that to be below a 6.5 percent. If you're over that, then we know that you are most likely a diagnosing candidate for diabetes. It's a big deal for diabetics to have their A1c below a 7. That means that they're doing really, really well. And so we look at that number quite a bit.

The goals for treatment. So the number one thing that is our job as chiropractors is we want to make sure that our athlete or our patient is able to control their blood glucose fluctuations during an activity and also before the activity and after the activity. Individual athletes have variable glycemic responses. What does that mean. It means that we can't create a uniform management template for them to follow because each person is going to respond to different environments, different food intake, different food timing differently.


So we can't just make blanket statements on how to manage diabetes. It comes down to knowing your patient, having those conversations with that patient or athlete, and making sure that they're educated and track their glucose and their diet effectively so they know how they operate best.

And the last thing that we want to do is we want to break through that psychological barrier for some of the athletes. Going into a state of hypoglycemia can be really, really scary, especially nocturnal hypoglycemia. So we want to make sure that the athlete feels comfortable and that they don't have to worry about whether they're going to spike or drop in their blood glucose during an athletic competition or performance.

What we need to identify. We need to know the influencers that create the fluctuation within the blood glucose, so what are the risk factors that create hypo or hyperglycemia. We need to know basal rate adjustments for that athlete or just basically to make sure that the athlete knows how to adjust their basal rate. And then we need to know what energy intake or what food intake best serves that athlete before competition, during competition, and after competition.

Here's a list of some risk factors that you guys can take a quick minute to read over. As you can see, many different things can cause hypoglycemia or hyperglycemia. If we take a peek here, we can see that different exercise matters. The environment that they're doing it matters. And even their body condition matters.

This is actually my favorite visual to describe things that can affect an athlete with diabetes. As you can see, we have exercise environment, bodily concerns, regimen changes, and then the



hypoglycemia-associated autonomic failure. So basically, this just tells us in a nutshell things that can really affect the athlete may create variables in their blood glucose levels.

The biggest issues that I run into with my athletes are the environment. So the football team that we treat, if they go out and it's a really hot and humid day, I know that my diabetic athletes are going to have a hard time controlling their blood sugar. Typically, they will stay really, really high. And they don't like staying in that state very much. So being aware of knowing triggers for causing the variability in the blood glucose levels is a huge deal as the provider and working with that athlete so that they can manage that to the best of their ability.

Now we're going to talk about basal rate adjustments. So remember that insulin decreases as glucagon increases. So the need for insulin decreases during exercise because glucagon increases since exercise is creating a state of lower blood glucose. And also making sure that we adjust our basal rates appropriately will reduce the risk of delayed hypoglycemia or nocturnal hypoglycemia depending on when the athlete is working out or has their competition. One thing that can help with that, research has found that doing a post-workout sprint will regulate the blood sugar so they don't have large blood glucose drops.


Now you can see a chart on basal rate adjustments. And just for those that aren't quite sure what basal rate is it's going to be used for individuals that have an insulin pump. And what it does is this is the rate that that pump is set at to give out insulin throughout the day. So it's the minimum amount of insulin required to manage normal daily blood glucose fluctuations.

It's really important to know how to adjust that for exercise because the exercise is going to create states of lower blood glucose. So if the basal rate is too high, then the athlete is going to have a hard time to recover. Because when they're done with their workout, they're going to be in a lower state than they want to be in.

The diet. The thing that we need to know as practitioners is what is going to help that athlete perform best energy-wise to control their blood glucose. So we need to know what fuel source they run the best on. The activity also may determine the fuel source. For example, if it's a long, long activity such as an endurance run, that athlete may want to add a little bit more fat to their diet. Or they also may want to have their gel packets with them so that if their blood glucose drops during a run, they're able to take a shot of that carbohydrate really, really fast.

Last thing you guys need to understand is the effects of the glycemic index or the effects of the glycemic load. Basically, this is just how fast the food is going to be absorbed by that athlete. Here is a reference chart for you guys for prior to exercise recommendations of where the blood glucose levels should be. Note that your athlete is going to know where they perform best on. So just use this as a little baseline for yourself just to kind of have an idea of where they should be.

And then always rely back on what that athlete says they perform best at. For example, I have an athlete that's a high performing CrossFitter. And he really likes to perform at 110 on his blood



glucose level. Now as you noticed, the chart says that they may start mild to moderate exercise at 150 to 250. For that individual, that's pretty high. So just know that it fluctuates per person.

One thing that we need to ask the question though is for these athletes, is a high carb diet best? One thing that we should be aware of is that high carb diets induce the need for higher insulin dosage. That can also lead to unpredictability in the blood glucose numbers because of the extra insulin that that athlete needs to take in. So blood glucose levels over 200 also cause loss of electrolytes due to the osmotic diuresis. This is really important for athletes because they need their electrolytes to perform at their best ability.

Other research suggests starting blood glucose levels at 182 to 270. Like I already stated, that seems pretty high. The American Diabetic Association suggests starting these at 90 to 200 milligrams per deciliter. So again, always refer back to what the athlete feels best performing at. That's the number that you guys are going to record and going to follow. So now for the case study.


The individual that I've been working with is a female American football player. She's middle-aged, a type 2 diabetic. When she first came in, her A1c was well above a seven. And her height and weight is 64 inches and 170 pounds. So we know that she's a little shorter and a little overweight. But that's OK. She plays middle linebacker.

Her primary complaint is low energy. And she feels really worn out throughout the whole day and through practice. She says that she just doesn't have the same kind of energy and the same kind of pop she used to when she's on the field. She also said that her legs don't have the endurance that they once did. And that was a big deal for her because she just feels that that keeps her going out on the field as well as she's getting cramping in her legs throughout practice.

Her individual goals were she wants to get her energy back throughout the day, maybe lose some weight, and for sure stop cramping. My goals were to control the insulin release and her blood glucose levels, stop the cramping, drop weight, and create an environment that fosters insulin sensitivity rather than resistance since she's a type 2 diabetic.

So the first recommendations I made was we did a 24 hour food recall. I just wanted to see what she consumed that day or in the past 24 hours. After that, I had her do a three day food journal. I told her I didn't care what she ate. I just want to see what three days in a row look like for her and her energy intake timing as well as the food choices she was making.

Next, we adjusted the nutrient timing. So we started breakfast with increased protein and increased fat and very low carb consumption. What does this do? It creates an environment of prolonged fasting. So it also creates a time where insulin spikes don't happen for a prolonged period of time. And then we're going to add in our carbohydrates closer to physical activity later in the day.



I wanted her to eat whole foods, nothing processed. So the patient started her day off now with a veggie cheese three egg omelet instead of gas station bagel sandwich. So right there, we already know that it's more whole food, less processed. And the carbohydrate consumption right in the morning is really, really low thus giving her a long, sustained energy without big spikes in blood glucose.

We also added in an amino acid and electrolyte drink during practice. We cut out her cheap meals. She said she loved Doritos. I told her I love Doritos. Everybody loves Doritos, let's be honest. So we cut those out. And we cut out little snacks that she wasn't recording either. I also suggested that she should take some chromium and B vitamin supplementation. But she denied taking those.

So the results. After a few months and her follow up endocrinologist's visit, she found all of that her A1c was below a 7. And she said that was huge because it's the first time that's happened in years. So she's at a 6.7 right now. And that's a win for us. Also she's lost 12 pounds since we started, she's had consistent energy throughout the day, and has decreased the cramping and restored her energy in her legs for practice.

So what's the role of the chiropractor? The role for you guys is one, identify those risk factors that we went over. Especially if you guys are working an event, you have to be able to identify if someone's going into a state of hyperglycemia or hypoglycemia. Be educated on the topic. Do some self-research. See what new topics are out there about athletes and diabetes. See what kind of new insulin pumps are being used. Be up to date on the technology that's following this disease.

Last and most importantly, work integratively with the endocrinologist and registered dietitian. You guys want to be able to have great working relationships with these medical providers so that you can all be on the same page. Don't degrade them. Don't degrade what they're doing. Take the information that they give the athlete and make it work for that athlete. But also rely on your own knowledge. Know what works for your athlete. Know what works for your patient.