

## Sawbones 234: Ketogenic Diet

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**Intro (Clint McElroy):** *Sawbones* is a show about medical history, and nothing the hosts say should be taken as medical advice or opinion. It's for fun. Can't you just have fun for an hour and not try to diagnose your mystery boil? We think you've earned it. Just sit back, relax, and enjoy a moment of distraction from that weird growth. You're worth it.

[theme music plays]

**Justin:** Hello everybody, and welcome to *Sawbones*: a marital tour of misguided medicine. I'm your cohost, Justin McElroy!

**Sydnee:** And I'm Sydnee McElroy. So, Justin.

**Justin:** Yes, Sydnee.

**Sydnee:** Uh, there is a trendy, popular topic that I've been getting lots of questions about lately.

**Justin:** I probably know about it, then. If it's trendy and hot, I'm—I'm looped in, probably, already. But, uh, I'll—I'll humor you.

**Sydnee:** Oh. Well, by all means, then.

**Justin:** I mean, I'm not a mind-reader! I just—I—I will probably know all about this hot topic.

**Sydnee:** Well, I get a—as you may guess, I get lots of questions, actually, about weight loss in general.

**Justin:** Sure.

**Sydnee:** A lot of patients who are—who are trying to lose weight and are not sure how to do it, and so as a result, I am usually kept abreast of most of the new kind of fad diets.

**Justin:** Mm-hm.

**Sydnee:** Because somebody's always trying them. And a lot of the times, this works the way, like—like, backwards. I hear about them, and then I have to go read about them and figure 'em out and—and... kind of come to a conclusion as to whether or not they're dangerous or whatever.

**Justin:** Mm-hm.

**Sydnee:** Um, and the one that everybody's talking about these days is the ketogenic diet.

**Justin:** Yeah, keto.

**Sydnee:** Yeah.

**Justin:** Heard a lot about that. I've—I've dabbled in... the low carb and slow carb worlds, and, uh—so I've heard a lot of chatter about...

**Sydnee:** Mm-hm?

**Justin:** ...keto diet. Um, uh... and have my—because of my time with—with Atkins, like, I know what the—what the name refers to. Uh, but... I don't know that much about it. I don't know how it differs from, like, other sorts of—of plans that are out there.

**Sydnee:** It's— I thought this would be a good topic. And we've had lots of people, I should say, suggest this – tweet it, and Facebook Message and email us about this – because it is so popular. And wanting to know, "Is it real? Does it work?"

And as I started to dig into it, the history of it—it's funny. This is one of those things that as I started to read, I thought, "I remember learning about this in medical school!" But I hadn't really thought about it since then.

**Justin:** Okay.

**Sydnee:** So the keto diet specifically differs from these low—these other low carb diets, uh, I think most interestingly in its origins.

**Justin:** How so?

**Sydnee:** So, the keto diet actually dates back to the 1920's. But it was not initially developed as a weight loss plan.

**Justin:** What was it?

**Sydnee:** The keto diet started out as a treatment for epilepsy.

[pauses]

**Justin:** Okay. I've never—I've never, ever heard that before.

**Sydnee:** Okay. So, to take you—to take you way back, in the way, way—in the wayback machine, for a second—

**Justin:** Okay.

**Sydnee:** —uh, as far back as Hippocrates, there was—there was this, uh—physicians noticed that there was this association between starvation and, uh, fewer seizures in patients who were prone to seizures. Okay? So there was already a connection. There was something that you could do with your diet that would make you have less seizures, or at least this is what Hippocrates observed and then theorized.

Um, and there were also certain—as a result of this, there were certain treatment regimens developed for people with epilepsy, uh, that mainly... were—I mean, they were basically starvation kind of diets.

**Justin:** Okay.

**Sydnee:** But also eliminated certain foods.

**Justin:** Well, if it's a starvation diet...

**Sydnee:** [laughs quietly]

**Justin:** ...then—

**Sydnee:** Well... [laughs quietly]

**Justin:** —that goes without saying, right?

**Sydnee:** Well, some of them eliminated only some foods... so that you were almost starving, but not completely.

**Justin:** Okay.

**Sydnee:** Uh, Galen also advised specifically, like, fasting for epilepsy, intermittent fasting.

**Justin:** Huh.

**Sydnee:** For epilepsy. So, for a long time we didn't really know why, but we knew that if you changed your eating patterns in very drastic ways, you could reduce the frequency of your seizures.

**Justin:** Okay.

**Sydnee:** So in 1911—this is—this is—we're jumping way forward now.

**Justin:** Yeah.

**Sydnee:** So in 1911, two doctors in Paris, uh, Gulep and Marie, Dr. Gulep and Dr. Marie, treated 20 epileptic patients with starvation. I don't know the details. They didn't really talk about the details of—of how—I mean, obviously they got something.

**Justin:** Yeah.

**Sydnee:** You can't starve people forever.

**Justin:** You can't starve people—starve people out.

**Sydnee:** You gotta give them something. But they gave them very minimal food intake, and recorded that they had amazing success in terms of reducing the frequency of these patients' seizures.

So this is obviously not a solution. We can't just starve people.

**Justin:** No, yeah.

**Sydnee:** But it did—it did lead to a lot of interest in...

**Justin:** So there's something to it.

**Sydnee:** Yeah.

**Justin:** I mean, there's something to—obviously not a long term, tenable solution, but there's something to the idea of dietary changes and reducing the frequency of seizures.

**Sydnee:** Yeah. There's something that happens in your body when you enter a state of starvation that somehow reduces the frequency of seizures. Uh, so in the early 1900's, a lot of other physicians in the US started—based on these results, started following suit and trying to experiment with different diets to see what would happen. Uh, there was a Bernarr Macfadden and Hugh—Hugh Conklin in Battle Creek. We've talked about Battle Creek before. That's where the—

**Justin:** That's where, uh, the Kelloggs were from, yeah?

**Sydnee:** Mm-hm, mm-hm. Yeah. And they—they dabbled in strange diets as well.

**Justin:** Sure.

**Sydnee:** Uh, and they both tried this with their patients, and they thought it was helping. Again—and there was no specific plan at this point. We're just talking about, like, drastically reducing food intake, you know. Just not eating very much at all. Because we still weren't sure what it was about the starvation that—that made people stop having seizures.

**Justin:** Yeah, could've been anything, right.

**Sydnee:** Right. Um, Conklin was kind of studying under Macfadden. He was kind of the guru of this at the time. Um, and Macfadden specifically would advise intermittent fasting for basically everything.

**Justin:** Um, I—

**Sydnee:** Like, any medical condition.

**Justin:** —I've heard—I know we're not talking about IF right now, but I have heard a lot of hubbub about—about intermittent fasting.

**Sydnee:** Yeah, me too.

**Justin:** Maybe—maybe you can tell me about that one next.

**Sydnee:** Uh, we could do that next time. But he was actually—and he—he basically was practicing this way back in the early 1900's. So he would advise that you fast anywhere from three days to three weeks, depending—

**Justin:** That's very—that's a very large range! That almost feels like guessing!

**Sydnee:** [laughs quietly] Uh, well, it depended on the condition that you were suffering from.

**Justin:** Ahh, alright.

**Sydnee:** So, some you only had to fast three days, some you had to fast for three weeks. Um, and it may have actually been kind of an accident that he found—he had such great success with seizures, because he was telling everybody to fast for everything.

**Justin:** So eventually you're gonna get... [crosstalk]—

**Sydnee:** Yeah, something worked. Something worked. He also, by the way, had a magazine. This doctor—I think this an interesting fact—

**Justin:** That's not actually true, actually. I said it's a false dichotomy that if you use a treatment on enough things it'll fix something eventually. There's lots of things we talk about that don't fix anything. [through laughter] That's—

**Sydnee:** Oh, that's true. That's fair.

**Justin:** —that is not—that is a... you know.

**Sydnee:** I guess if you do that enough, odds are eventually some treatment might work for something.

**Justin:** If it does, for it.

**Sydnee:** Maybe.

**Justin:** Maybe.

**Sydnee:** Possibly. Maybe.

**Justin:** If you use enough. Or not too much.

**Sydnee:** This is not the way we practice medicine, nor would I advise you to really do anything this way.

**Justin:** That's—yeah, it's a wild sort of approach all around.

**Sydnee:** [laughs] Uh, just a side note on this Macfadden guy, he also had a magazine that he published—

**Justin:** Cool.

**Sydnee:** —for quite a while called *Physical Culture*. And the whole idea—

**Justin:** That's a very good name.

**Sydnee:** —was—was, like, humans are puny, and we need to teach them how to be big and strong and beautiful.

**Justin:** Charles Atlas kind of stuff?

**Sydnee:** Yeah, and we can do it through diet and exercise.

**Justin:** A—accurate.

**Sydnee:** And he was like this—it—it—well, yes... but—I mean, this was all very much like, "We will improve the human species. We'll make you bigger, stronger, faster."

**Justin:** Oh.

**Sydnee:** "Eat these weird diets and do all these wild exercise." I imagine lots of, like... squats. [laughs]

**Justin:** It's weird that that would need to be an ongoing magazine, right? Like, it's kind of like *Men's Fitness* that has been goin' on for so long. Like, certainly by now... there's enough information there for us to get fit, right? Like—

**Sydnee:** [laughs]

**Justin:** —certainly you—you've covered it.

**Sydnee:** He had to keep—he had to keep hammering away at, like, inspiring housewives to...

**Justin:** Sure.

**Sydnee:** ...look good for their husbands, or whatever the message was back in the early 1900's. So this—this kind of research proba—in, like, a less flashy way, was being repeated by Doctors Lennox and Cobb at Harvard, and they were really interested into—as to why starvation might do this. I mean, it's not just that you can't eat. Like, there's something that happens... metabolically, when your body is in a state of starvation, that must be causing this.

And so they began to study the starvation state, and they found that when you—when you don't have glucose, sugar, for energy...

**Justin:** Mm-hm?

**Sydnee:** ...then you start to break down fats.

**Justin:** Right.

**Sydnee:** Right?

**Justin:** Right.

**Sydnee:** And what do they make?

**Justin:** Energy.



**Sydnee:** Well... yes.

**Justin:** Waste products.

**Sydnee:** I thought you would know this.

**Justin:** Ketones.

**Sydnee:** There you go!

**Justin:** Yes.

**Sydnee:** Ketones. Ketosis.

**Justin:** Yes, ketosis.

**Sydnee:** Ketosis. You're making ketones, because you are breaking down fats.

**Justin:** When I was on the Atkins, I had to get ketosis strips from a weird mom-and-pop pharmacy. It was the only place I could find around here that sold 'em. You gotta pee on the strips and...

**Sydnee:** I believe you can find them pretty much anywhere now.

**Justin:** Well, it's a different era, Syd. Back then, I had to go out to the—the Food Emporium for my sprouted grain... Elijah bread.

**Sydnee:** [laughs]

**Justin:** [holding back laughter] Now it's on every store shelf all around you.

**Sydnee:** Now it's at the Kroger.

**Justin:** Well, not the—it's at the... the nice Kroger.

**Sydnee:** Yeah.

**Justin:** It's at fa—it's at [unintelligible] Kroger, not regular Kroger.

**Sydnee:** Call it the cha-cha Kroger.

**Justin:** Cha-cha Kroger.

**Sydnee:** And the Gucci Kroger.

**Justin:** Gucci Kroger. That—that—

**Sydnee:** [laughs]

**Justin:** —at Gucci Kroger, they have, like, all kinds of sprouted grains.

**Sydnee:** Yeah.

**Justin:** At the, like, mid-tier to low-tier Krogers, you're not gonna find that.

**Sydnee:** [laughs] Uh, so there was a—

**Justin:** Don't waste your time lookin' for cheese either, folks. You want cheese? You gotta go [through laughter] to Gucci Kroger.

**Sydnee:** Go to Gucci Kro—they all—that's right next to the sushi place.

**Justin:** Yeah, Gu—

**Sydnee:** The [crosstalk] sushi.

**Justin:** —Gucci Kroger, you know you're at—

**Sydnee:** They make sushi right there.

**Justin:** —you know you're at Gucci Kroger 'cause they got a sushi prison in there, which is like a little island where they make people stand in it and make sushi.

**Sydnee:** Let's call it Sushi Island.

**Justin:** Sushi Island is a much more pleasant metaphor. Thank you.

**Sydnee:** It's right next to—

**Justin:** I do think they have an egress.

**Sydnee:** [laughs] It's right next to the fancy cheese island, and the, um—

**Justin:** No one mans the—

**Sydnee:** —loose—the loose nuts stand. [laughs]

**Justin:** Yeah. No one mans Fancy Cheese Island, though. Fancy Cheese Island is an island unto itself.

**Sydnee:** [laughs]

**Justin:** Sushi Island is manned... 24 hours a day, I'm assuming.

**Sydnee:** So, uh, there was a Dr. Wilder at Mayo. Everybody's doing this research at this point now, right? Everybody's all excited. They're like, "We found ketones! What do they do? We don't know! Let's try this!"

So he proposed that you could probably treat patients better by eating food instead of starving.

**Justin:** Love that.

**Sydnee:** And—and focus on foods that will produce the ketones. So, starvation produces ketones, breaking down fats produces ketones. Eat fat, break it down into ketones. That's better than eating nothing.

**Justin:** That seems like a—

**Sydnee:** That's where this comes from.

**Justin:** —that seems like kind of a hacky solution, but is that right?

**Sydnee:** Yeah! A diet that does that is ketogenic, so the more fat you eat, you break that down preferentially.

**Justin:** Okay.

**Sydnee:** Yeah. If you don't—I mean—now, the only way to do this, though, is—and we're gonna get to this, actually that's the next thing—is through a *very* restrictive diet.

So on Atkins, do you remember how many grams of carbs you could eat?

**Justin:** 20 at the start.

**Sydnee:** Uh-huh.

**Justin:** In induction. Now, that's for two weeks.

**Sydnee:** Okay.

**Justin:** And then it built there for, like, 30, and then... I think 50 was, like, long term. And then I think it was, like, 100, once you got to, like, your goal weight.

**Sydnee:** So the diet that Wilder started using, that was the original ketogenic diet—this is the original KD... [laughs quietly] uh, was one gram of protein per kilogram of body weight... ten to fifteen grams of carbohydrates per day.

**Justin:** Y'all, that's cra—like, that's, like, um...

**Sydnee:** And then the remainder of your calories will be in fat.

**Justin:** I mean, you could clear that with carrots and cauliflower. I mean, like, that's nothin'. Those 20 grams, by the way, you can only get in the induction phase, to give you some idea, I think you can—you're supposed to only get from, like, leafy greens and vegetables and stuff like that. So there's, like... it is—it is a tough, tough row.

**Sydnee:** And this—and this isn't—this ketogenic diet is the basis for what—I think the standard regiment that a lot of the books—'cause there are—there are endless books on the ketogenic diet. I was trying to find the first one that was, like—that was selling it as a weight loss diet as opposed to a treatment for epilepsy, and I have—I don't know. I mean, I just—I ran out of patience for books about the ketogenic—there are endless, endless books about this.

But I think the general idea is that you're supposed to eat, like, 70% fat, 25% protein, and 5% carbs.

**Justin:** [scoffs]

**Sydnee:** Is, like, the general breakdown.

**Justin:** No, thank you.

**Sydnee:** Based on this regimen. And this original regimen, by the way, was only developed for children.

**Justin:** Really?

**Sydnee:** Mm-hm. It was a way to reduce seizures in children.

**Justin:** Why not adults?

**Sydnee:** [laughs] The—the easy answer is this: adults couldn't do it.

**Justin:** Cowards.

**Sydnee:** It was a lot easier to give these diets and study them in children, because parents were administering them.

**Justin:** Mm-hm.

**Sydnee:** So you could trust that—I mean, these were parents who—who usually had kids who had—who—their seizures were frequent and debilitating, and they weren't—at the time, we didn't have a lot of great treatments anyway, so they weren't responding well to the treatments. And so they were desperate for something that might work, and so they were willing to—to do the hard thing, and do this diet. A lot of adults just would not stick to it.

**Justin:** Adults require us to breed a race of super-parents to parent the parents.

**Sydnee:** [laughs quietly] But if the—if the kids have to eat whatever their parents give 'em, it was a lot easier to control. Um, and they also noticed things like improvement in cognitive function and behavior, they reported; so not just a reduction in seizures, but, like, the kids said they could think more clearly. Um—

**Justin:** I don't... that was not my experience! [wheezes] In—in severely reducing my carbohydrates! I could think—I could think *very* clearly about Cheetos. Like, I could think—like, I could almost visualize them perfectly in my mind. I do not remember much clarity from those days.

**Sydnee:** Now, at this point, when all these studies started to show improvement, and this—this diet was formally written down as the keto diet, um, it just exploded in popularity. Because again, at the time, there really weren't great me—there were very few medicines at all for seizures, and they made a lot of kids really kind of drowsy and out of it, and they didn't always work, and...

Uh, so the ketogenic diet became the standard treatment for all kids with epilepsy. As in, like, first line treatment. Every textbook that you would read from, like, 1941 to 1980, if you go to "Epilepsy," would tell you, "Ketogenic diet."

**Justin:** Okay.

**Sydnee:** Um... and, you know, like I said, there was evidence that it—it would work. Not in every single kid, not every single time, but it definitely was found to be successful. In, uh, his—in 1972, there was a Livingston, who was a doctor who did a lot of research in this area and treated a lot of patients with epilepsy at Johns Hopkins.

And he went over, um, 1,000 children with epilepsy that he followed for a decade, and from that, using the ketogenic diet, he said that 52 percent had complete control of their seizures, and then an additional 27 percent had improved control of their seizures on this diet.

**Justin:** Wow.

**Sydnee:** So... pretty good evidence that—that this could work. Uh, *why* did it work? We're still not entirely sure.

**Justin:** That's comforting.

**Sydnee:** Um... well... yeah, but, I mean, the more important thing is that it does.

**Justin:** True, fair.

**Sydnee:** But we're still not entirely sure what the ketones do to the brain to reduce the frequency of seizures. There's some sort of... some... I don't know. It—it changes the nervous conduction in some way. Um... there have been—people have proposed that it change—it alters the pH of the inside the neurons in some way.

**Justin:** Mm-hm.

**Sydnee:** Ei—either way, the point is that somehow these ketone bodies, when they cross the blood-brain barrier and get up into the brain... reduce the frequency of seizures.

**Justin:** Oh. Okay.

**Sydnee:** We know that this can happen. But, as time passed... new and more effective medications were made. And it became a lot easier if your child—especially if you had to transition into in adulthood—you know, if you still had epilepsy as an adult and you needed to control that, it became very hard to maintain that diet once—I mean, you imagine—

**Justin:** You were allowed to buy food.

**Sydnee:** —like a—yeah, a teenager who for the first time can go to a fast food restaurant on their own... it—it gets a lot harder to control.

So, um, medications kind of took over. And as we had better medicines that wouldn't make everybody drowsy and loopy and we had medications that you could take on a regular basis and still feel awake and functional and think straight, um, the diet began to kind of fall out of favor. Because it was hard!

**Justin:** Sure, yeah. It's extremely difficult.

**Sydnee:** Yeah. It's a—it's—I mean, it's a very hard diet to maintain. Um, there were—there were efforts to try to make it a little more palatable. There was a specific diet where—it was called the medium chain triglyceride oil diet?

**Justin:** Snappy.

**Sydnee:** Which was basically of introducing other—[laughs quietly] other fats that you could add to, like, these weird, pureed shakes that you would have to make.

**Justin:** Mmm!

**Sydnee:** To get the right mix of calories and everything into kids. And—and this was a little bit more palatable. But overall, if you could take a pill and that would control your seizures....

**Justin:** Of course, yeah.

**Sydnee:** ...a lot of people began to prefer that. And as fewer kids were put on the diet, fewer dietitians were trained in it. And, as you can imagine, this is a very difficult diet to explain to parents, so it's not like... "Only eat this many carbs a day." It's—it's much more restrictive than that. So if you don't have dietitians who are very well versed in how to communicate that to parents, then you're gonna have more trouble using the diet. And so then fewer people are using it correctly, so then the effectiveness seems to wear off, so doctors stop prescribing it.

And, pretty soon, it was kind of like people forgot about it. It became—it became this, like, third-tier thing. So, if you've got a patient that you've tried on medication and you've tried another medication and you're still not getting anywhere, then you might consider adding the ketogenic diet at that point, as opposed to, you know, 30 years before that when it was the number one, primary mainstay of childhood epilepsy treatment.

**Justin:** Well, it couldn't have gone away, though, Syd, because I hear about it all the time.

**Sydnee:** That's right. It came back.

[pause]

**Justin:** Go on?

**Sydnee:** Well, before I do... let's go to the billing department.

**Justin:** Ahh. Let's go.



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**Justin:** So the keto diet was just starting to—was somehow going to make a comeback.

**Sydnee:** That's right. So, everything changed in the 90's. This is why the—the keto diet did not fade into... well, I guess, the kind of thing that we cover on—

**Justin:** Into *Sawbones*, yeah.

**Sydnee:** —into *Sawbones* history. Um, a—a Dateline special revived it. It told the story of young Charlie Abrahams, who was the son of Hollywood director Jim Abrahams, who was responsible for *Airplane!*, in part.

**Justin:** Mm!

**Sydnee:** Partially responsible, I guess.

**Justin:** He was a... writer?

**Sydnee:** A writer?

**Justin:** Yeah, is that right?

**Sydnee:** Yes.

**Justin:** Okay.

**Sydnee:** And then he directed some stuff too, I think. And the *Naked Gun* movies.

**Justin:** Oh, really?

**Sydnee:** Yeah. And, uh, his son Charlie was being treated for epilepsy with little success. Uh, and so his family learned, when trying to just find anything that would work—learned about the ketogenic diet, and they used it, and Charlie had a

huge improvement in his symptoms. And they kind of became advocates for it after that. So they started the Charlie Foundation to spread the word, and to educate more people about the possibility that if they had a child who was resistant a lot of medications and they couldn't seem to get the seizures under control, this could really improve their life.

And so in, um—in pursuit of spreading the word about this diet, in 1997 the movie *First Do No Harm* was made, starring Meryl Streep. Um, and I think this is the one that—he directed it.

**Justin:** Mm-hm.

**Sydnee:** Um, and this told the story of his son, and how they used the diet.

**Justin:** It's—it's almost kind of unfortunate—I shouldn't say—I don't mean it as unfortunate, but the fact that people found the diet in obscurity that is actually useful from ancient wisdom—even though it's the 20's, but still—

**Sydnee:** [laughs]

**Justin:** —that—you see that fallacy so often in, like, a bunch of woo and alternative medicine. Like, it's a little concerning to me that this one time, it worked! They found an old diet that nobody used anymore and... and son of a gun, it was actually useful.

**Sydnee:** Well, this is—

**Justin:** I'm glad, obviously, for the people that it helped, but it's just... a bad precedent.

**Sydnee:** I was gonna say this—no, no. I was gonna say this at the end, but I think this is—this is a good place to make this point. There is—there are a lot of people who will tell you that food alone can be medicine, that you could control all of your medical problems through diet. And I would push back and say, "Well, no. That's not entirely true."

But I think that—that that's why sometimes medicine can be frustrating for people. For, you know, sometimes especially, like, chronic medical conditions or difficult-to-control medical conditions can be frustrating, because what I'm gonna

tell you—and I think this is the right thing. I think this is the truth. This is why I'm saying it—is that the answer is usually... somewhere in the middle. It's gray.

Medications are needed for some things. Yes, diet can improve some other things. Everything's not one or the other. Food is not the only medicine, and medicine is not the only medicine. There are times for both, and there are times that you can use them together and—and improve situations.

And, um, that's a lot less satisfying than just having one thing you can advocate for.

**Justin:** Right, right.

**Sydnee:** "Food is medicine." Um, but that—that's the truth! Sometimes a diet regimen like this can really work for a medical condition.

**Justin:** So people got way back into the keto diet, because of Meryl's flick.

**Sydnee:** Yes.

**Justin:** And—and this—the situation—

**Sydnee:** And what was also happening at this moment in history... is the low carb craze.

**Justin:** Yeah, it was hot right then.

**Sydnee:** Yeah, so you can see—so... so all of—so first, all of these patients got back into it. So first, a lot of people whose family members or who personally had epilepsy began to get interested in the ketogenic diet for that condition, as a result of this film and the Dateline special.

**Justin:** Okay.

**Sydnee:** Um, and the number of studies on the ketogenic diet just shot through the roof. Like, if you look at the years between, you know, when the first anti-epileptic medications that were really effective came out and this movie, if you look in between there, there were a couple studies, maybe, a year, being done on the ketogenic diet.

If you look after this Dateline special and then the subsequent movie, *tons* of studies came out to—to see if it really would work. Um, and of course they were finding that it—

**Justin:** Still for epilepsy.

**Sydnee:** —it could be effective. Yes. Again, still just for epilepsy. Um, because it—and I'm gonna say this several times. This is a medical treatment. It's not just a diet. This is a treatment... that you should take as seriously as if you were taking a medication.

**Justin:** Because it is...

**Sydnee:** A medical treatment.

**Justin:** Okay, got it.

**Sydnee:** And there are—there are side effects. There are some that maybe you consider not such a big deal, like constipation or diarrhea or getting... nauseous and vomiting sometimes. And those could improve over time, and also if you have a dietitian who's helping you kind of tailor your meals, you know, to something that—that might not make you so sick.

You can also get some things like vitamin deficiencies from this diet that can lead to osteoporosis in some cases, thinning of the bones.

**Justin:** Mm-hm.

**Sydnee:** Um, another problem that you can see is... not what you'd think. You actually can get elevated cholesterol at the very beginning. Which it is a high fat diet, so maybe you would assume that. But you can see some really out-of-wack cholesterol profiles in people who are on this, short term. Now, for a lot of patients this will iron itself out long-term and you'll actually see improvement in cholesterol over time, but transiently, you can see some really high, bad cholesterols on this diet.

Um, and also, even though all these things I mentioned can be manageable, it's really hard to do!

**Justin:** Yeah, I can imagine.

**Sydnee:** And if you don't stick to it, it won't work. And I don't mean, like—I mean, I'm on Weight Watchers, and I have times where I'm like, "I'm gonna just eat half this muffin and I'm not gonna count it, 'cause I need half this muffin right now." And that's fine. [through laughter] That's not gonna hurt anybody.

Um, but the—if you're not sticking to this diet, it will not work, and you have to stick to it to the letter. Um, and... I—I should note, historically, a variation on this was used—we've mentioned this on the diabetes episode. That idea that starvation would improve diabetes was also very prominent for a while, which is why you're gonna see, like, this get tied into a treatment for diabetes.

Um, the problem with that, of course, is that we do not want type one diabetics going into ketosis.

**Justin:** It could be very dangerous for them, right?

**Sydnee:** Yes. That is called diabetic ketoacidosis, DKA. It is a very dangerous state, and can be fatal, which is why I would not recommend this for a type one diabetic.

**Justin:** Okay.

**Sydnee:** Um, so, how did this become a diet trend? Well, people who couldn't stick to the ketogenic diet in its entirety started kind of tryin' other low carb diets that weren't necessarily as restrictive. And we are at just the right time for the Atkins diet.

**Justin:** Mm-hm.

**Sydnee:** So, the Atkins diet was very popular. It was a low carbohydrate diet. Um, and it was easier, as you can imagine, than the ketogenic diet.

**Justin:** Yeah.

**Sydnee:** Um, and it also *could* send you into a state of ketosis.

**Justin:** It's supposed to, yeah.

**Sydnee:** 'Cause, I mean, eating low carb doesn't necessarily put you in ketosis.

**Justin:** Really?

**Sydnee:** No. I mean, you *can* get in ketosis, but you have to—I mean—

**Justin:** I was always—

**Sydnee:** —you're not—you have to check to see if you are.

**Justin:** —I always used as a barometer of success—probably not the right word, but I used it as a metric of success. I'd say that. That if I was in ketosis, I knew I was doin' a good job.

**Sydnee:** If you were in ketosis, it means that you have succeeded in getting yourself into ketosis. That is about all I will say. [laughs quietly]

**Justin:** And the strip turned purple, so that's huge.

**Sydnee:** Yes. So you have definitely succeeded in that. Um, and so all these low carb fans who... like, people who were using the ketogenic diet, couldn't stick to it, and so kind of went into Atkins, or one of the other, you know—South Beach, and—you've done slow carb, and all these other varia—low glycemic index diets. Um, variations on low carb—started to try out those.

Uh, people who were tryin' out these other low carb diets started, in their searching, finding evidence of the ketogenic diet. And as you have already said, if you were doing Atkins, you were told that you needed to get into a state of ketosis. That was important. And so now you have this diet that's called the keto diet.

**Justin:** Just puts you right there. The fast lane.

**Sydnee:** That seems even better, right? That—that sounds better. And, like, we—I don't—and for a lot of people, I don't even think they know necessarily what they're doing. Like, "I'm supposed to be in ketosis. I'll check my urine to see if I'm ketosis. If something puts me into ketosis faster, I'm doing good, so... I'll do this diet, this keto diet."

**Justin:** Right, right.

**Sydnee:** And so we—we heard these, like, stories back—I think around, like, 2012 is where you can find, like, the origins of this becoming this weight loss fad.

**Justin:** Hm.

**Sydnee:** And there was this article about brides who were trying to make these keto smoothies and—and take them through—in, like, tubes through their nose, 'cause they're so gross.

**Justin:** Ugh.

**Sydnee:** 'Cause, I mean, it's no—like, no sugar.

**Justin:** Yeah. I know. Eugh—eugh, a shake with no sugar is, like, so heinous. Aww...

**Sydnee:** That's why a lot of these, like—the—a lot of people who were trying to do this diet—I mean, if you can just imagine some, like—some kind of fat, some kind of, like—like, coconut oil I think is a popular one—some kind of, like, heavy duty fat, and you can throw in some, like, protein powder...

**Justin:** [groans]

**Sydnee:** ... and... I don't—is there any kind of milk you can do on this?

**Justin:** I don't know.

**Sydnee:** Any kind of, like, almond—

**Justin:** Maybe... hemp—

**Sydnee:** —nut milk, or—

**Justin:** —[through laughter] hemp milk? I don't know! I don't know.

**Sydnee:** —soy milk? No. I don't know. I mean, but, like, you would have to blend up this—and it would have zero sweetness. Imagine something that looks and—and, like, you look at it and you think, "This should be a vanilla milkshake," and then there is *zero* sweetness to it.

**Justin:** Ugh.

**Sydnee:** And it's full of fat.

**Justin:** Ugh... okay, I'm done. I quit.

**Sydnee:** Yeah. I mean, so—these are hard to—

**Justin:** I'm quitting the diet.

**Sydnee:** —these are hard to ingest. Um... and so then the—then the ketogenic diet became this diet that people were using for weight loss, and everybody was going keto, and now there are, like, a billion... cookbooks, and—and descriptions of how to do the diet, and there—there are ways to do it—kind of like you said with Atkins, where you can do, like, an induction phase and then, like—

**Justin:** Slow it down a little bit.

**Sydnee:** —but generally speaking, you're supposed to keep yourself in ketosis to lose weight. And to keep yourself in ketosis, you don't just eat low carb.

**Justin:** Yeah. You have to...

**Sydnee:** I mean, it's *extremely* low carb. Like I said, I mean, if 10 to 15 carbohydrates a day...

**Justin:** That's—that's—that's really tough.

**Sydnee:** That's—that's incredibly tough. And you have to eat lots of fat, which...

**Justin:** No. This sounds like a hard pass.

**Sydnee:** Which—and it sounds like—you know, like I said, there was a lot of concern—this was true with Atkins, too—that if people were eating all this fat that their cholesterol was gonna go through the roof, and there is some evidence that maybe early on it does.

Long-term, I—I don't have good evidence to tell you that it's dangerous, so... if that—if that helps. Um, but generally speaking, you still have to eat a lot of fat, and I don't particularly enjoy that.



Um, does it work? Well... if you're going to eat this low carb... yes, you will lose weight.

**Justin:** Sure. 'Cause you can't eat anything you like. That's the secret of low carb. [snorts quietly]

**Sydnee:** [laughs quietly]

**Justin:** The secret no one will tell you is, if you can't eat anything that tastes good, you will lose weight. [laughs quietly]

**Sydnee:** The—and this is the grand debate about low carb diets, right? Are you losing weight because, as Justin said, you're not getting to eat the things you like? Is it also because you're eating low calorie as a result of low carb? Carbs pack a lot of calories.

**Justin:** Sure.

**Sydnee:** It's hard for you to get in this—if you—if you stick to one of these diets, it's very difficult to get in the same amount of calories that you would if you were eating carbohydrates. It's just hard to do. We don't—we don't wanna eat that much lunch meat.

**Justin:** [laughs] Maybe *you* don't.

**Sydnee:** Well—[laughs quietly] I mean, it's just—it's true! And so is it really a low calorie diet, and you're just doing it in a roundabout way? Probably not just that. There's enough evidence to suggest that something else is happening when you do a low carb diet.

**Justin:** Well, I also found, uh, it's a little easier to control, like—just be in control of cravings and eating and stuff if you're not on that sugar train. No up and down.

**Sydnee:** The insulin spikes are where a lot of the interest lies. If you're not spiking your insulin in response to eating sugar all day, are you reducing cravings? And then you're reducing that—you know, insulin is a storage hormone. Every time you eat something sweet, your body releases insulin. It makes you store fat. Is that... the key to weight loss, is stopping those insulin spikes?

**Justin:** I don't know. Why are you asking me?

**Sydnee:** Well, I'm saying that's the—that's the question. And that's why people theorize low carb works better. Um... [sighs] the thing is, there are small studies that suggest that it can help with some medical conditions, like type two diabetes.

Um, those same studies have been done with any low carb diet, though, and type two diabetes.

**Justin:** Mm-hm.

**Sydnee:** I mean, eating—and I think that makes sense. If you are a diabetic, a type two diabetic, people tell you to eat less sugar and watch your carbs.

**Justin:** Yeah, yeah.

**Sydnee:** So it makes sense why that might help. Um, if you're a type one diabetic, I would be extremely cautious with anything like this.

**Justin:** Okay.

**Sydnee:** I would not voluntarily put yourself in ketosis.

**Justin:** Okay.

**Sydnee:** Um, obviously with things like high cholesterol, maybe in the long run it helps, which... could that help with cardiac risk? Heart—heart attack risk? Maybe, maybe.

But when they put 'em head-to-head in big studies with other diets... they don't always necessarily—ketogenic certainly doesn't necessarily outperform other low carb diets routinely, so can any low carb do this? Probably. And there are even some studies that suggest that you can get the same result by eating low calorie.

**Justin:** Hm.

**Sydnee:** So... is it the magical key to weight loss? Probably not. Because, as I already mentioned, it's incredibly hard to stick to, and most people don't.

**Justin:** And nothin' is—I mean... you gotta eat in a way that works for you.

**Sydnee:** This—this has to be something you can sustain for your whole life.

**Justin:** Mm-hm.

**Sydnee:** Um, or you'll gain the weight back. And—

**Justin:** And weight—and weight loss is a much less important goal than—

**Sydnee:** Than health.

**Justin:** —being healthy, and eating well, and, you know, eating things that make you feel good, and... you know, give you energy.

**Sydnee:** And—

**Justin:** To fight crime.

**Sydnee:** —carbohydrates are good! Like, they taste good!

**Justin:** They are also good! A lot of people aren't willing to talk about that, Sydnee. That's a great point.

**Sydnee:** [holding back laughter] They taste yummy, and I agree! I mean, I—I limit my carbohydrates as part of the diet we're doing right now because it helps me lose weight, but I do eat some, 'cause I like them. And every once in a while, I eat a donut, 'cause I love donuts.

**Justin:** And you don't tell your phone.

**Sydnee:** [laughs quietly]

**Justin:** So the phone don't know.

**Sydnee:** And I don't tell my phone about that donut. And that—but I'm—but that's for me, and that's what makes me happy, and I think everybody's gotta find that balance. But I would just—I would stress again, this can't—the ketogenic diet, especially if you have certain medical conditions, could make you ill. It is a treatment. [pauses] It is a medical treatment.

**Justin:** [laughs quietly] I think you have—

**Sydnee:** It is not a fad diet.

**Justin:** —I think you have reinforced that.

**Sydnee:** And—and I would not approach it lightly. Um, and I would certainly ignore celebrities like Kourtney Kardashian, who have claimed that doctors told her she *needed* to do the ketogenic diet because she had excess lead and mercury in her system, and this would help her get it out.

**Justin:** Those are not good doctors.

**Sydnee:** That's not a thing. I—you—do you really think somebody told her that?

**Justin:** [hums doubtfully] Maybe she was, like, half listening? I don't know.  
[wheezes]

**Sydnee:** These were not... doctors.

**Justin:** I don't know which of them that she is. Is she the smart one?

**Sydnee:** I—I don't know the Kardashians. I—I know Kard—I know... Kardashians are a thing, but I don't know—

**Justin:** Yes, I know of their existence.

**Sydnee:** —which one is which.

**Justin:** Uh, folks, that's gonna do it for us this week. Thank you so much for listening. Uh, thanks to The Taxpayers for the use of their song "Medicines" as the intro and outro of our program.

Hey, if you want a new podcast to listen to, check out *Bubble*. It's a new short-run sci-fi comedy series that Max Fun is doing. You can find it wherever fine podcasts are sold. Just search for "Bubble!" And, uh, I think you could get a kick out of it.

Um, anyway, folks, that's gonna do it for us. Thank you so much for listening. We'll see you next week. Until then, my name is Justin McElroy.

**Sydnee:** I'm Sydnee McElroy.

**Justin:** And, as always, don't drill a hole in your head!

[theme music plays]

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[chord]

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