

Sawbones 217: Goiter

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[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.

Justin: Well Syd, we've had our finger on the pulse the last couple weeks.

Sydnee: That's true, that's true.

Justin: Been real plugged into the zeitgeist. And you said that this week, you wanna take it back. Take it old school.

Sydnee: That's right. I wanted to step back. We've been doing some trendy topics, which I think are interesting because everybody's talking about them and everybody wants to know more about them. But there's a lot of stuff—there's so many things in medicine that are common, and have a long history, and a lot of stuff to talk about, and I'm consistently amazed that we haven't done it yet on this show. But that's also a good thing, because maybe our show can be infinite.

Justin: Yep. Oh, yeah, I love that.

Sydnee: [laughs] Maybe that's what I'm learning. And the topic we're gonna discuss this week is one of those. I don't know how we haven't talked about yet, because it's also one of our most requested topics. And that's thyroid disease. I know that doesn't sound as sexy and exciting as raw water and Tide pods.

Justin: No, I'm loving it. You sort of said, right before we started, it was funny, you said uh... you didn't include a section on what the thyroid is or how it works, because you sort of assume that everybody just knew that. To which I kinda did, um, I took a bunch of water in my mouth so I could do a spit-take and shake my head violently to say no, Sydnee, I don't have any—I literally couldn't get a hemisphere of the body where the thyroid is.

Sydnee: Really?

Justin: I do not know if it's in your brain or your butt.

Sydnee: It's in your neck.

Justin: Great. See, I would have been wrong on both counts.

Sydnee: Yeah. See, that surprises me because—

Justin: Does it?

Sydnee: Well, okay.

Justin: [laughs]

Sydnee: Here's my rationale. This is very reasonable. It's a common—it's common to have problems with your thyroid. That's one of the more common disorders, and I get asked about it by patients a lot. I have, like, a lot of people who request that I test them for it. So, I guess my impression is that it's out there in the popular medical knowledge...

Justin: Right.

Sydnee: ... is my impression.

Justin: I'm not saying that no one knows. I'm saying that, like, Hoops doesn't, and I'm here to speak for the trees, by which I mean... people like me.

Sydnee: [laughs] Well, a lot of people did know about it and requested it, and I'm gonna list them all now. That's Kim, Shannon, Miranda, Megan, Brian, Loch, Karen, Kate, Emily, Ryan, Jill, Sylvia, Rebecca, Jack, Margaret, Anne, Kaitlin, Latisha, and David. Thank you all for

recommending this topic. Like I said, I don't know how we haven't covered it yet.

So, let me explain. The thyroid gland, if you don't know, is a gland that consists—it's an endocrine gland, it consists of two lobes and an isthmus that connects them.

Justin: Okay.

Sydnee: A little piece of tissue that connects the two lobes. And it's right in the front of your throat. Of your neck. It's right there in the front. And the primary function – it does some other things, but the primary function of the thyroid gland is the secretion of thyroid hormones. Thyroid hormones are largely responsible for aspects of your metabolism.

Justin: Okay.

Sydnee: So, and this may be why I get the request to test for it a lot, is because, if you don't have enough thyroid hormone, one of the major symptoms—two of them, I guess, that I get asked about a lot, are weight gain and fatigue.

And those are big concerns that I spend a lot of time with my patients discussing, so maybe that's why I get that request a lot, is people thinking, like, "Gosh, is there something else wrong?" and they're looking it, and they're finding thyroid disease as a common cause.

So, your thyroid gland secretes these hormones. It is stimulated by your brain to do so. And I think it's important just to take a second to explain that a lot of the... especially in the endocrine system, but a lot of glands in your body work on sort of a feedback loop.

Justin: Okay.

Sydnee: So, your brain releases signals to your thyroid gland to say, "Hey, make thyroid hormone. The body needs it." And your thyroid gland responds by making thyroid hormone.

Justin: Predictable.

Sydnee: And then that thyroid hormone goes back to the brain to say, "Hey, don't worry, I'm here, the gland is working. Your job is done."

Now, what can happen if the thyroid gland isn't doing what it's supposed to do is, your brain just keeps sending more and more and more signals. Which is part of how we test for a diagnose thyroid disease, is looking for increased numbers of these signals and decreased amount of this hormone and so on and so forth.

I think that kind of idea, that a lot of systems in your body work on feedback loops, is important to understanding this.

Justin: Okay.

Sydnee: Okay. So, while there are different disorders of the thyroid gland, largely groups as either not enough thyroid hormone or too much thyroid hormone, the one that has the most history, I would say, is the goiter. Which is an enlargement, a diffuse enlargement, of the thyroid gland.

Justin: Something about iodine.

Sydnee: Yes, and it has something to do with iodine.

Justin: Yesss.

Sydnee: So, we'll get into that. And the goiter, I think that there's the most history associated with it simply because you can see it. Right?

Justin: Right.

Sydnee: It's a big swelling in your neck. And you can look up pictures of goiters and see some really impressive swellings.

Justin: Sounds like a cool afternoon.

Sydnee: Well, I'm just saying.

Justin: "What are you doing? Hey, Dan, what are you doing?"

Sydnee: [laughs]

Justin: "Um, looking for impressive swellings in my Google image search of..."

Sydnee: Of goiters.

Justin: “Goiters. ‘Cause Sydnee said it was worth doing.”

Sydnee: I’m just saying, there’s some really impressive goiters throughout history. So, if you look to, like, ancient painting and drawing and depictions, you’ll see lots of people who have goiters. It’s one of the most depicted, probably, medical conditions throughout history, again, because it’s really easy to see.

And throughout history, it’s been—like, a slightly swollen, rounded neck has either been kind of... sexy... [laughs]

Justin: [laughs]

Sydnee: And associated with attractiveness, or, “Uh oh, something’s wrong.”

Justin: Right, but still sexy.

Sydnee: Maybe. I mean, that’s fine, if that’s your thing.

Justin: I mean, something’s wrong, but that’s a sexy goiter.

Sydnee: If you like round necks, hey.

Justin: I gotta see if SexyGoiters.com is taken, real quick.

Sydnee: [laughs] While you’re doing that, I’m gonna say that, again, this is probably because it was really easy to see and fairly common as well. Throughout history, the goiter is actually a pretty common medical condition because of iodine deficiency, which we’ll get into.

You can find references to goiters in Chinese texts that date back to 2700 BCE. There are images of Cleopatra that appear to have a goiter. That’s been disputed, did she have a goiter or not? But there’s some depictions of Cleopatra that would indicate she may have had a goiter.

Justin: I had no idea.

Sydnee: You can see paintings from the 7th century that show angels and saints and even depictions of Mary and Jesus as having goiters. Not that I’m saying they did, it was just a very common thing to paint people with goiters.

Justin: We don’t know if Jesus had a goiter. Yeah.

Sydnee: Jesus may have. I don't know. Maybe he had a goiter. There are mentions of different swellings of the neck, if you read ancient Chinese medical texts. Specifically from 85 AD, we get these descriptions from a physician, Tshui Chin-thi, who is talking about some swelling of the neck are no big deal and some swellings of the neck are very bad and can kill you.

And he's probably distinguishing between goiters versus benign thyroid nodules. Sometimes you can have just have nodular, like, little bumpy areas of tissue that mean nothing. And then, obviously, you can get cancer of the thyroid as well. So, he was probably distinguishing between these different conditions, although it would be hard to do that at the time.

If you go back to 1400 BCE, ayurvedic medicine from India defined not only the goiter, but also broke it down into sometimes this thing in your neck tends to be over-functioning, sometimes it's under-functioning. Which was really neat, 'cause we shouldn't have really been able to understand what any of that meant back then.

Justin: Right.

Sydnee: But they were able to tie different symptoms and maladies to that thing in your neck not working correctly, which was way ahead of their time. And if you look at the descriptions of under-functioning and over-functioning thyroid, they're pretty similar to what we call hyper- and hypothyroidism today.

Justin: Speaking of those words, could they not have found two prefixes that sounded a little more different? You really have to hit that R to make it clear which thyroidism you're talking about. And seeing as they are the exact inverse of each other, that seems very problematic to me.

Sydnee: [laughs] I will tell you that I recognize that, because whenever I'm discussing it in my day job, I very clearly say "hyp-O" and "hyp-ER."

Justin: And people think Sydnee is—

Sydnee: And people think there's a problem. [laughs] The treatments, though, are fairly different from what we would do today. Even though we see these ancient depictions of, "Ah, these are pretty good descriptions of what this disease is," the treatments are not the same. So, for hyp-o-thyroidism—see, I just did it. [laughs]

Justin: You did.

Sydnee: You could try to prevent it by eating a lot of rice and barley and sugar cane juice and cucumber and milk.

Justin: All very, uh, a lot of sugar. A lot of 'ose.

Sydnee: Not necessarily something that would prevent hypothyroidism, more than likely.

Justin: Yeah.

Sydnee: The treatments largely consisted of some herbal medicines that were thought to, like, give you energy, vim and vigor, and boost your metabolism. Because fatigue and weight gain can be associated with low functioning thyroid. And then, there were some that made you pee. Just give people diuretics. Because you can also get some swelling, especially in the legs, associated with low thyroid.

Justin: Would that have worked?

Sydnee: Uh, probably not for the kind of swelling that you get from— I mean, maybe it might help a little, but it's not gonna solve the problem. You need thyroid hormone.

Justin: Hmm. Alright.

Sydnee: It's a different kind of swelling. It's called "pretibial," meaning right in front of your tibias, so in front of your shinbones, you get swelling there, "myxedema," we'll call it a lot. And it's a very particular swelling that is associated with low thyroid function.

Justin: Alright.

Sydnee: Yeah. So, it may have helped a little, but that would be it.

When it came to goiter, they thought that it was probably a result of the same swelling that they were seeing in, like, the legs. So, they just thought, "Well, the neck's swollen too." So, there was no thought that it was a different disorder, there was a different way to treat it, it would probably have been treated the same way. Diuretics.

Hippocrates thought that the thyroid was basically a big salivary gland.

Justin: That's true.

Sydnee: No. [laughs]

Justin: Well, I took a shot, Syd.

Sydnee: No.

Justin: If that had panned out, I would've looked smart.

Sydnee: Did you really think that was where I was going with this? "And it turns out, he was right." [laughs]

Justin: No. I mean, it's very rarely that, but what a called shot that would have been. You know?

Sydnee: [laughs] He thought that it just made juices that lubricate your respiratory passages and that was pretty much it. No other...

Justin: That's wrong, from where I sit.

Sydnee: That's not what it does. Well, I think I've already said kinda what it does, so that's not...

Justin: Yeah, well.

Sydnee: Galen disagreed, arguing that it probably absorbed secretions, as opposed to making them.

Justin: And he was right.

Sydnee: No. [laughs]

Justin: Crap! How could they both be wrong and opposite? One of them's right!

Sydnee: Well, they were both basing it on the fact that the thyroid seems spongy.

Justin: Okay.

Sydnee: They agreed that it was spongy.

Justin: They both agreed sponginess was a factor.

Sydnee: But was that for secretion, you know, like if you squeeze a sponge, I guess, and so water comes out of it? Or for absorption? They didn't know. But it's spongy either way.

Galen also thought that the goiter was a herniation of the larynx. So, your voice box. He thought that the goiter was just kind of like, it poking out there in your neck. And the term "goiter" actually probably originated from the word "guttur," which means larynx, or bronchus, in Latin. Or guttur [pronounced differently]. Probably guttur.

Justin: Hmm. Alright.

Sydnee: But anyway, that's not correct, it has nothing to do with that. But that is where that word comes from. Pliny, of course, had his own ideas. Pliny the Elder.

Justin: He's gotta get in the mix.

Sydnee: He had a theory, and this was actually widely believed at the time, that goiters were caused by drinking snow water. [laughs]

Justin: What?!

Sydnee: Specifically, like, alpine snow water.

Justin: "Oh, I see what you did there. You've been skiing? I can tell."
"How did you know? Amazing. Pliny, you're amazing. How did you know?"
"Well, the goiter. From the snow water you drank. Did you get thirsty and—"
"Yes, I drank snow water! You're amazing!"

Sydnee: [laughs] This probably had to do with certain parts of the world where, especially like in Bavaria, where the soil is not particularly rich in iodine, and so you see like, a prominent—like, there's a lot of goiters.

Justin: Mm.

Sydnee: And so, they're connecting all of these snow-covered mountains, and people go skiing, and—

Justin: Correlation, not causation.

Sydnee: Yeah. That kinda thing. There's this weird connection between all this, and the two things did exist, but there had nothing to do with each other.

Justin: Right.

Sydnee: People probably did drink snow water.

Justin: Sure. It's delicious and cold, who wouldn't want some snow water?

Sydnee: This association was so strongly made that, actually, if you look at some traditional, like, Bavarian clothing from especially the Salzburg area from the 19th century, it includes a choker that especially women would wear. You know, the necklace, the choker. Didn't know if you were—you looked confused.

Justin: No, I understand that.

Sydnee: It includes a choker that was called the kropfband or struma band, which was specifically to either hide a goiter or to hide whatever was left after you'd had surgery.

Justin: So like, okay. I'm having trouble understanding something. A goiter—you can remove a goiter, or, like, you need—do you always have a goiter, or do you only have a goiter when you have a goiter?

Sydnee: [laughs] No, not—okay. A goiter is, like, the thyroid gland is too big. It's an overgrowth.

Justin: Okay, but you can't just take that out, right? Because you need the gland.

Sydnee: Well, you do need the gland, but now we can replace the hormone that you need. So, if we have to take your thyroid out, we can—

Justin: But back in these days, they couldn't have.

Sydnee: Well, they could have removed part of it and left part of the gland.

Justin: They were just guessing anyway, right? You're only gonna live to 35, let's just roll the dice.

Sydnee: But a partial thyroidectomy, only removing part of the thyroid, is not—I mean, that happens even today. So, that would not have been impossible.

Justin: Okay.

Sydnee: So, removing a goiter would have been totally possible once we knew how to do surgery and such.

Justin: Okay, got it.

Sydnee: So, recommended treatments from the Greek and Roman era encompassed a lot of different substances. Especially things like lizard and dog poop. I have no idea why that associated was made. There are some things we're gonna get into that made a lot of sense. That didn't.

Justin: I think any time we use poop in treatment, we were probably just kinda guessing.

Sydnee: Yeah.

Justin: There's very little, like, logical line you can draw between, like, "Well, I don't know, maybe..."

Sydnee: "It's just poop."

Justin: "It's just poopy, maybe..."

Sydnee: "Yeah, try it. I don't know."

Justin: "I don't know."

Sydnee: There was one Roman physician, Aulus Celsus, who advised just cut it out. Or maybe burn it out.

Justin: See, I think that's a problem. Don't burn it. Oh man, Celsus!

Sydnee: I mean, I'm not saying that we're not gonna get there, but at the time we probably couldn't have done that well.

Da Vinci drew the thyroid gland. If you look at his anatomical diagrams, he was aware of its existence, he drew it. And his theory as to what it did, because he had no idea, I just think it's an interesting theory. He thought that it basically just filled the space between the neck muscles. [laughs]

Justin: [laughs]

Sydnee: Just kinda, well, you need something there to fill that empty space. And it keeps the trachea from bumping up against the sternum.

Justin: So he thought it was a shim, basically.

Sydnee: [laughs] Yeah.

Justin: Like, one of the body's many shims. [laughs] A spacer to keep things apart.

Sydnee: To make everything look nice. That's such an artistic way of looking—well, you need something there to hold all those other structures in place, so we'll just, there it is. There's the thyroid.

Justin: Right.

Sydnee: The first mention, and this becomes a very common treatment throughout history. There is a mention from China, 1600 BCE, of using burnt sponges, as in, like, sea sponges, or seaweed, as a treatment for goiter. This was a good idea. They didn't know why, nobody knew why it was a good idea.

Justin: They just...

Sydnee: But it was one of those times where they tried something, it probably did help, and people kept trying it.

Justin: I wonder how they got to that. Just, like, intuitive? Or... that's wild. Just throwing spaghetti at the wall, I guess.

Sydnee: It's wild. I mean, how do people figure things out before they understand the medicine underneath? But they did, and these substances do contain iodine. Which is why they helped. And we're gonna talk about why iodine helps with goiter soon.

Justin: Oh no.

Sydnee: But first...

Justin: Ach.

Sydnee: Let's head to the billing department.

Justin: Leave me hanging. Let's go!

[ad break]

Justin: Now Sydnee, you promised me a lot of talk about iodine and then just left me hanging.

Sydnee: [laughs]

Justin: And I'm hoping you can hold up your end of the bargain now.

Sydnee: I'm gonna go ahead and deliver on that now, even though there's a lot more history to get through. I do want to make clear, 'cause I think that it helps to understand the discoveries to follow. So, iodine is essential in producing thyroid hormones. Without iodine, your body can't make them.

Justin: Okay.

Sydnee: And iodine is considered an essential element, meaning that we don't make it. We need to go get it from food. And it's easy to get nowadays, and we'll talk about why. It's not something you probably think about, like, "Did I get enough iodine today?" We've made that pretty simple.

But back before we understood its importance, it really depended on where you lived. Some areas have soil that is naturally very rich in iodine, and so—

Justin: So you just eat the dirt.

Sydnee: Well no, I mean, you don't eat the dirt. But you eat, like...

Justin: Vegetables grown in the dirt.

Sydnee: Food from the dirt, and water, that kinda stuff.

Justin: Yes, yes.

Sydnee: So, iodine would have been easy to just get from your environment. But if you lived in areas where there was iodine-poor soil, you may not have gotten enough naturally through your diet.

Things like seaweed naturally contain a lot of iodine, and so that's why you start to see these themes emerge of people eating things that have iodine in them, that will then give your body what it needs, which means your body can start making thyroid hormone, which means your brain can stop stimulating your thyroid gland, which means it won't get so big. Does that make sense?

Justin: Yes. What does iodine look like? For some reason, I always imagine it in like—like, it looks like a bottle of ink. That's the image I always get in my head when I think about iodine. Just like, a big bottle of ink. But I don't think that it's like, dark purple and black, or kinda think of iodine that way, but...

Sydnee: Yeah, well when it was first—no, but when it was first discovered, there is – and we'll talk about when it was first discovered – they did associate it with, like, a purple poof of smoke, or something.

Justin: Okay. Maybe we're all just—

Sydnee: Maybe that's where that comes from.

Justin: Yeah, who knows? I don't know. That's just what I think of when I think of iodine.

Sydnee: No.

Justin: Okay.

Sydnee: It is dark, but like, it's orangish. Brownish.

Justin: You know what? I might have seen somebody do an experiment that showed the iodine in salt using purple something, and I just got some wires crossed in my head.

Sydnee: I think—and I don't know, I'm not a chemist, I do think there are forms of iodine that have a purpleish... I think you're right. I think it depends on what form of iodine you're using.

Justin: Can you just say that again? I've never heard you say it while we were recording.

Sydnee: [laughs]

Justin: Just repeat that out loud. I wanted to make an isolate text message alert-able...

Sydnee: I am certain our chemist friends who listen can clarify that point. But I think the color of iodine—

Justin: Hey, listen, y'all. I love you. I love you so much, I love all of you. I'm a very busy man. Do no tweet at me about the color of iodine, please. I beg of you, please set me free, don't do this. [laughs]

Sydnee: Well, the preps we use in surgical—like, iodine for surgical procedures and things like that are not purple, but I'm not saying—I mean, you know, it's like a lot of things. It depends on, like, is it in a salt form, or is it liquid, is it solid? Like, it can change color depending on what form it's in. So, you know.

Justin: Okay.

Sydnee: Anyway. So, in the 6th through 8th centuries, surgeries continue to be attempted. As I already said, like, people have already kinda started to think, like, "Maybe we should do surgery for this. Just cut the goiter out." And they're mainly either using hot wires... ugh... to try to kinda cut through the tissue...

Justin: Very unpleasant.

Sydnee: Or if you can't do that, they—

Justin: They didn't have knives? Like...

Sydnee: Well, that was your backup. They would try to, like, stitch hot wires through it, slowly.

Justin: Oh! Ohhhh.

Sydnee: Or just use a scalpel if you couldn't do that.

Justin: Okay.

Sydnee: That was the backup plan. It wasn't until the 10th century that Albucasis removed a whole gland while a patient was really high on opium.

Justin: Nice.

Sydnee: So, it was like anesthesia, you know. I mean, it was for a purpose.

Justin: Medicinal opium?

Sydnee: Medicinal opium. In the 12th century, though, goiter was largely treated with things like calcium and copper and sulfur and ammonium salts. Or they had, like, a specific concoction of barren walnut leaves, roots, wine and pepper.

But underneath all these other random things people were trying, you still see recommendations for things like burnt and dried marine sponges. So again, returning to... iodine being present in substances, even though people didn't know.

While a lot of different physicians were trying to study the thyroid gland, especially in terms of goiters, because they were so prominent and so many people complained about them probably, because a lot of people had them, there was a lot of disagreement as to, you know, what was going on. What was the disease, what was the cause?

They were thought to be related to the trachea sometimes, some people thought they were related to the heart, to the spleen. They argued over whether it was there just for shape, or was it there to make things, or was it there to absorb things. Some people followed the Hippocratic tradition, some people believed Galen was right. They thought it was maybe just a buffer between the heart and the brain.

Justin: Okay...

Sydnee: Provided some sort of conduit between the two.

Justin: Sure.

Sydnee: Whatever. Surgery was still popular as a treatment when you didn't know what else to do, as well as just like, squishing the gland down. Like, wrap it with cloth soaked in vinegar, ammonia...

Justin: Like a little girdle? Like a little...

Sydnee: Neck girdle.

Justin: Goiter girdle?

Sydnee: A goiter girdle. [laughs] Exactly. Seaweed, marine shelf sponges, they still persist, and you would have thought by now, they would have taken over, but no. People are still doing other weird things.

And finally, we figure out iodine in the 1800s. That's when we really make a breakthrough. In 1811, there was a Frenchman, Bernard Courtois, who accidentally figured out iodine. He wasn't trying to. He was not a doctor. He was actually trying to find a way to, um, help manufacture gun powder. [laughs]

Justin: Oh, fun. Okay.

Sydnee: So, not at all looking to cure people, really.

Justin: Right.

Sydnee: He was working with Napoleons army and he had run out of the willow ashes that he needed to make sodium carbonate, which...

Justin: Is in gun powder.

Sydnee: Apparently is in gunpowder.

Justin: It's part of salt beer.

Sydnee: Yeah.

Justin: They talk about it in 1776, I think.

Sydnee: Okay, so there you go. And so, he began burning seaweed and was using those ashes instead. And he added a little too much sulfuric acid at some point, and in all of this, a purple puff of smoke, like I said, arose, and it hardened into some violet crystals. So, some form of iodine is purple.

Justin: Something's purple.

Sydnee: There you go. He basically said, "I don't know what that was," and went back to trying to make gunpowder.

Justin: "Anyway."

Sydnee: [laughs] But eventually, this substance that he isolated would be studied again, figured out that it's iodine, named, and voila, we know what iodine is.

Justin: So he just left the purple dust? [laughs]

Sydnee: Yeah.

Justin: In a pile there, "That's somebody else's problem."

Sydnee: I guess? He must have written about it though. Like, clearly he wrote it up.

Justin: Something. He apparently wrote it up, because we put him in this episode of Sawbones. [laughs]

Sydnee: [laughs] He wrote about it and said, "Whatever."

Justin: We very rarely include people in histories for leaving dirt around. [laughs] Leaving weird purple dirt on their desks.

Sydnee: "This seems interesting, but I'm very much into gunpowder right now."

Justin: "I want history to remember I found out about this and did nothing with it. I need to put this in my journal."

Sydnee: [laughs] So, all of those substances that we've talked about before, turns out they contain iodine and that's part of why it helped. Eugen Baumann, a scientist in the 19th century started, while we were studying different things, like, "Okay, so we know there's different things in the thyroid, so maybe we can help people by figuring out what they're lacking or giving them those substances," and that kinda thing, he boiled a thousand sheep thyroids in sulfuric acid, collected the stuff that precipitated out of it, and he noticed that there were high levels of iodine present in it. So, reaffirming that there's iodine in there.

Justin: Perfect.

Sydnee: And he began to treat patients with goiter with this sheep thyroid extract.

Justin: Ah. That sounds like—out of context, sheep thyroid extract would sound very much like one of our fake treatments that is on Sawbones.

Sydnee: Nope, it is real.

Justin: It's a real one.

Sydnee: I mean, the original treatments for thyroid were, like, animal thyroid extract. So, there you go.

Justin: There it is.

Sydnee: So we've figured out. And this is the same period of time we're really starting at this point in history to figure out a lot of stuff about thyroid glands. This is the same time where we connect it to something, because I know a lot of people have also written specifically asking about this, something that used to be called "cretinism." That is a term that we no longer use in medicine, it's considered a derogatory term. And so, I purely mention it for, you know, historical academic purposes.

The term cretinism is someone who is born with congenital hypothyroidism. This usually means that whoever was carrying the child had hypothyroidism and was not treated, and therefore, the fetus suffered some effects from that, and so was born with hypothyroidism. I mention it because we finally figured out that all of this was connected and we could treat people born with this condition with thyroid hormone.

Justin: What is the name of it now? What do we call it now?

Sydnee: Congenial hypothyroidism.

Justin: Okay.

Sydnee: But the name—a lot of people talk about where did that name come from, cretinism. And there are several theories. The one that I learned in med school actually is not certain. It is one theory, but I was taught that it was absolute. I remember being told this and thinking this is correct. And from what I've read, this is just one possibility. It comes from the word for Christian, and it was thought that these people could not sin, because there were usually some cognitive delays associated with it.

Justin: Okay.

Sydnee: And so, it was thought that these people were incapable of sinning, because they didn't understand the difference between right and wrong. So they were connected with Christ-like behavior. And that is what I was taught that word came from. It may actually have been connected to Christian in terms of, these are human beings, and an attempt to try to humanize people who have some sort of disability through the naming of it, if that makes sense.

Justin: But still, we're not sure about this enough so we just decided as a community to say, like, "We're not gonna say that anymore."

Sydnee: Well, it's a derogatory term. You should not use it. It is not a term that we use in medicine. We are taught it for historical purposes in med school, but we say congenital hypothyroidism. That is the term.

Justin: Right.

Sydnee: In the following decades, Graves and von Basedow were two doctors who began to define the opposite, hyperthyroidism, meaning you make too much thyroid hormone. And that's why Graves' disease is one version of that to this day. There are many reasons why your thyroid might become dysfunctional, I'm not gonna go into all of them, but Graves' disease is one.

And all the symptoms that come with that, so whereas people with not enough thyroid hormone can have fatigue and weight gain and dry skin and their hair can fall out and constipation and the swelling, people with too much thyroid hormone will have kinda the opposite symptoms.

Justin: So like, everything's great? Like, they have full, lush hair, and they can lose weight really easily?

Sydnee: Well, they do lose weight really easily, but it's a bad thing. They can become, you know, they can lose too much weight.

Justin: Oh, okay. Alright.

Sydnee: And you can have diarrhea, and your heart races, and you're anxious, and you're sweaty. It's not a good thing.

Justin: Not a good thing.

Sydnee: Your heart can beat so fast that you have arrhythmias, abnormal heart rhythm.

Justin: Gosh, okay.

Sydnee: So, no. So it's not a good thing.

Justin: Well there's egg on my face.

Sydnee: Either way, it's not a good thing. And in addition, in this period of time, somebody actually proposed for the first time, maybe we should start adding iodine into something everyone eats. Like, how about salt?

Justin: Hmm.

Sydnee: And everybody kinda, like, was like, "Nah."

Justin: "I don't know. Sounds hard."

Sydnee: "Yeah." This wouldn't happen for like, another 100 years. Like I said, it was initially mentioned—the guy who mentioned it was David Marine. He was a pathologist from Johns Hopkins, and he had this interest in goiters, and he found this idea from a French chemist who existed long before him, whose last name is... Boussingault. I'm trying my best here with the French pronunciation.

Justin: It's fine, it's sounded good to my ears.

Sydnee: And he had noticed all the way back in the 1830s that if you found places with crude sea salt, which has iodine in it, people don't have goiters, but places where they didn't have that, people did have goiters. And so he had recommended this idea of, like, put iodine in the salt.

Nobody paid attention to it until David Marine did many, many years later. And he said, like, "You know what? Everybody eats salt, so why don't we just put iodine in the salt?" and kinda stole this idea from 100 years ago. Which was good one then and is a good one now.

And it seemed like a good solution. So, after he did some experiments where he took a bunch of, actually, schoolgirls who lived in an area that was prone to goiter development, and he gave them iodized salt and none of them ever got goiters, everybody went, "Yay you did it."

Justin: "Hooray!"

Sydnee: And so, it started out in Michigan, and they started adding iodine to salt, and that has continued, and it's a huge public health triumph. Most of our salt is iodized. Did you know that?

Justin: Yeah, well didn't we do—we did a salt episode where we talked about it.

Sydnee: Yes.

Justin: So I did know that, because I remember all of it photographically.

Sydnee: [laughs] So, by adding it to our salt, we are all ensured—we love salt. We are all ensured that we get plenty of iodine in our diet, so then we don't develop goiter.

By the mid-1900s, as I had already alluded to, we knew that using thyroid extract from animals to treat hypothyroidism and goiter and that kind of things was successful. So we began to synthetically produce thyroid hormone, commonly called levothyroxine nowadays, or Synthroid is the brand name a lot of people connect it with. That's a brand name, but levothyroxine.

So, commonly we use that to just replace the thyroid hormone that you don't have enough of. It's that simple. I like elegant solutions. It's just, it's that easy. You don't have enough, we give you some.

And we use, like I said, we use iodine to prevent goiter, as well as if you have too much thyroid hormone, hyperthyroidism or Graves' disease, something like that, we can actually use radioactive iodine to destroy thyroid tissue. Because your thyroid gland is gonna soak it up. So, we use that to destroy excess thyroid tissue as well, so it is both a... I don't know, that seems like a—it is a treatment, although it is doing something destructive. It is a treatment as well.

It took us a while to figure out the right dose, and we initially gave a lot of patients too much iodine in this process, and so, there are symptoms of iodine poisoning that we figured out from that. But since then, we are much better at it. And so now we know the right dose of iodine to give people and we know how much thyroid medication to give people.

Justin: Hooray!

Sydnee: We figured it all out.

Justin: Alright, we did it.

Sydnee: Pretty much.

Justin: Do you ever wish that you—do you ever feel like you missed, like, a lot of these good medical puzzles? Do you wish that you lived in a time period where, like, there was still a lot of this unsolved, ever?

Sydnee: I think there still is.

Justin: Oh. Okay, well good.

Sydnee: [laughs]

Justin: That's right, cancer and stuff, right?

Sydnee: Yeah. I mean, I think, you know, we've talked a lot about—

Justin: But these are, like, the easy ones, right? Like, you get to, like, "Just salt maybe? I don't know."

Sydnee: "Just some salt."

Justin: "Try a salt, rub a seashell on it. That worked! Where's my medal?"

Sydnee: I would say two things. I would say, one, there are still a lot more puzzles. Because we didn't talk a lot about, for instance, thyroid cancer, and when you talk about cancer in general, there's something we still have a lot of work to do to figure out how best to treat.

But the other thing I'd say is, there's a different puzzle here. We may have figured out that, in this country, we add iodine to salt, and so, we see much, much less goiter. I mean, it's possible, but I've never seen a case of goiter in my career.

But, there are many places in the world where they don't have access to any kind of iodized food, and so, they're not getting enough iodine, and we're still seeing goiter as an endemic problem. So, there's still that puzzle, which is, "Well, we may have solved it in some places, but how do

we make sure that everyone has access to that medical knowledge and that treatment and that same care that we're getting?"

Justin: I don't know, Sydnee. I don't know.

Sydnee: So, there's a whole other puzzle that maybe interests me just as much. Maybe a little more, sometimes.

Justin: Folks, that's gonna do it for us for this week. Thank you so much for listening. And thanks to the Max Fun network for having us as a part of their extended podcasting family. You can find all their great shows at MaximumFun.org.

Also, thanks to The Taxpayers for letting us use their song "Medicines" as the intro and outro of our program. And most of all, thanks to you for listening. We sure appreciate it and we hope you'll join us again next time. But 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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