3 - Mastering the Medtronic 780G – The Incredible Hulk of AID Systems

John Pemberton (00:09.966)

Welcome to the Glucose Never Ice podcast where science meets real life experience to empower diabetes management. I'm John Pemberton. I've lived with type 1 diabetes since 2008 and have spent nearly 20 years mastering both the science and art of managing it. Through personal experimentation, published research and my work as a diabetes specialist dietician, I've gained deep insights into what truly makes a difference. When my son Jude tested positive for type 1 diabetes antibodies,

I realised that all the knowledge in my head was wasted if I couldn't communicate it in a way that was clear, actionable and easy to come back to. So I built the Glucose Nevelise Education Programme, a free online resource designed to teach people diabetes management exactly the way I'd want people to understand it if they were looking after my son. After battling a functional motor disorder for many years and recently experiencing a major depressive episode, I was eventually pulled out of that hole by my friends, family and professionals who helped me get back to being me.

That experience taught me the power of giving and this podcast is my way of giving back. My co-host Louise is a highly experienced diabetes nurse with over 20 years in the field. She brings a wealth of knowledge and her superpower is making complex diabetes science accessible and practical for everyday life. She is the best diabetes nurse I have ever worked with and there have been some good ones. Most importantly, she keeps me in check and keeps the podcast on point. So if you're living with diabetes or supporting someone who is,

We want to make things easier, clearer, and importantly, more enjoyable. We hope you enjoy the content. If you do, please share it with those who may like it too. As a disclaimer, the information shared on the Glucose Nebulize podcast is for informational and educational purposes only. While we discuss strategies and insights for diabetes management, this podcast is not a substitute for professional medical advice. Always consult your healthcare team before making any changes to your diabetes plan. That done with,

Let's get into the content.

John Pemberton (02:13.806)

podcast episode three and this is all about the Medtronic 780G, what we classify as the Hulk, the one that has the most aggressive post meal control. So this is the third episode. On the last episode we discussed around the control IQ and on the first episode we talked about AID systems in general, some of the pros and cons and decision-making tools, but now we're going to do a bit more of a deep dive into the 780G, its pros, its cons, who it may be suitable for and if you have selected it for, for it,

maybe some of the things that you can optimise to manage it. I think we should be front up and say that where we work with, this is the one we've got probably the least amount of people on, although we have some experience. So just take that as you will. We know a lot in theory, we know some in practice, but we may not know the full pros and cons. So you may be listening to this going, know more than these guys. That's absolutely fine. Absolutely agree there.

So obviously what we have here is the one good thing, certainly around this is you've got, they're all Medtronic products. You've got the Medtronic pump and you've got the Medtronic sensor and you've got the Medtronic algorithm that are all kind of, would say like an Apple approach. They've got everything within house there. So usually it'll be the, obviously the 780 pump. It'll either be the Guardian sensor three, four or Medtronic Simplera. And then it's the smart guard algorithm that's housed within the pump. That's actually again,

within the pump and not on the phone, although you can have a phone to display the glucose readings, to display what the algorithm is doing, and also to automatically upload to the internet. Do you want to add anything to that? No, absolutely would agree from those sort of component parts. And that is what's quite nice about it, that it's all as one, a Medtronic download, a Medtronic pump, a Medtronic sensor, so that, yeah.

Definitely the Apple analogy is good there. So just to talk about how the algorithm works as best as we can. So essentially this is slightly different to the other algorithms. The other algorithms generally taking multiple factors when making decisions, instant on board, carbohydrate centered and a lot more detail. Whereas the, what we'd say is that the smart guard is very glucose centric. It looks at where the glucose is going.

John Pemberton (04:34.562)

how far it is away from the target that you want, and then it prioritizes just getting that glucose level to that target level. So it's very much driven by two things. One is the active insulin time, and the other one is the target glucose level. And this has an advantage that a target glucose level can go down as low as 5.5 millimoles per liter, which means that that is probably the second most aggressive behind the Cambridge system.

And also the active insulin time, can set as low as two hours, which means that any insulin that's been given by the user or has been put in by the system, it thinks it only works for two hours. Therefore it thinks that it's disappeared after that. Meaning if the glucose level is going higher, it is very aggressive in that scenario of putting more insulin in. And we generally have tended to start with an active insulin time around about two and a half hours, three hours, and try to bring it down to two if you possibly can. Yeah, absolutely. Because there's very little.

as John said, that you can adjust in terms of how the algorithm works. And I suppose it's just worth saying about that target glucose. You can only have that one target glucose level across the 20, across the 24 hours unless you use exercise sort of active temporary target. Sorry, is the term the moj.

Yeah, that's probably one thing as a healthcare professional, even as a user with these systems, there's so many terminologies and different things we're to mess some of them up, but that's just part and parcel of what it is. So how the algorithm works is if it sees that the glucose level it predicts half an hour in the future is going to rise, it starts to increase the basal. But if it hits kind of around about four times of its maximum basal and it's still not able to get on top of that glucose level rising, it's predicted to go above 6.7, it will throw in an auto correction every five minutes. So when we say it's like the hope,

in terms of being very aggressive. That is how aggressive it is on post-meal glucose levels. And if you have a short active insulin time and a low target level, you can really, really get on top of post-meal highs, especially if you're someone who is not so proficient at giving the insulin before eating. You can really get some help with this system in terms of tackling after meal highs. So it's reassessing every five minutes and thinking about an auto...

John Pemberton (06:48.206)

correction that would go in every five minutes should it be necessary? Yeah absolutely. So then thinking about that, that is obviously very helpful for people who have very, I guess, structured lifestyles where they have, you know, kind of like your three meals, they're not doing a great deal of activity in between eating, allowing the system to get on top of post meal highs if required, but can cause a few issues.

if you've got someone who all of a sudden wants to get up and start doing lots of movement after eating when they've got all these automatic corrections on board. So it's just, I guess to be mindful of that. And I guess the younger you are, we talked about some of the other systems, you can have a tighter target overnight and a more relaxed target during the day. That does become problematic when you only can set one across the board. So again, if you're going to be really aggressive is great for post meal control, but it can throw up a few challenges on the sort of flip side from there.

So how, obviously we haven't mentioned things like insulin sensitivity or different insulin sensitivities, so correct me if I'm wrong, it's sort of working out that insulin sensitivity, we have no control over that. Yeah, so as I understand it, it kind of looks at the last six days or so, a total daily dose and updates it on a daily basis and use it as a rolling average to work out how much insulin is being given on those times and then it will update its total, it's

correction factor, it's aggressiveness based on that total daily dose. So again, if you are someone who during the holidays is kind of really quote unquote lazy and your insulin requirements go up by 10, 15 % and then all of a sudden you get back to work or you go back to school, the system will not know that yet and it will have a much stronger correction or sensitivity factor.

which might drive a few hypos. So if you're gonna go over suddenly go changing your insulin sensitivity by radical changes in your daily routine, you might get caught out a little bit and you might potentially need to elevate that glucose target a little bit if you've been lazy for a while. On the flip side, if you've been really, really active and all of sudden you go into a lazy period, it's not gonna be strong enough. So again, you could bring the glucose level target down. again, if you understand how these things work, you can adjust.

John Pemberton (09:04.398)

the system to sort of manage that. I think we sort of pop down here, you know, really if you're going to use a system like this, you want to get the most out of it, which is you want to probably at the highest have a active insulin time at three hours, but get it as close to two as you possibly can and have a glucose target as close to 5.5 as you possibly can. But there's always a balance. Obviously, if that's meaning you're getting more than 4 % high POS, pull back, know, don't don't just because.

something, you know, has got a hammer doesn't mean everything's a nail. You need to kind of assess your control and see where you're at. Yeah, no, definitely. And also this, there's not many things to change. You can only change the personal glucose target, the activity time, and then your carb ratios. So again, if you want to plug and play, this is particularly helpful. I think I did mention in the first podcast, something to be mindful of.

is that this uses the Medtronic Simplera or G4 sensors. And what we've seen of some of the recent data is, for example, a Medtronic 780G at 75 % timing range gets the same HbA1C as a control IQs and a Dexcom G6 at 68 % timing range, mainly because the Medtronic sensors are a bit more aligned with venous glucose, whereas the Dexcom sensors are a bit more aligned with capillary glucose levels, which means that they don't capture

Post meal highs or the higher levels quite as accurate one good thing for the medtronic system is it means that you won't miss high pose with this system But you may under read highs slightly meaning that your higher timing range that you will certainly achieve on this system Might not translate into improved HBA 1c's it won't be worse, but it might not be what you're expecting so it's just something to be mindful of and as you have a look at that, but certainly

I know the real world results and the control trial data for the Medtronic 780G is extremely positive, been used widely and getting excellent results. So again, there's no bad choices with

these systems and this one will certainly get on top of the post meal highs. So I think that's everything for the 780G. Obviously we'll be touching a lot more on the specifics of how to optimize control and timing range when we go through the top 10 tips on future episode.

John Pemberton (11:22.392)

but hopefully this has given you some 780G specifics that might give you some tips on either choosing it or if you do choose it, the ways to of optimize some of your settings. Our next session is gonna be, our next podcast will be on the Cambridge system, bit that Louise is probably the professional on, so I'll probably speak less in that one and we'll let Louise rip. But yeah, we'll go through together the Cambridge system, so we hope to see you on the next podcast.