



99| Neuropsych Bite: Clinical Case 10 – With Dr. Marc Norman

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Speakers: Marc Norman, John Bellone, Ryan Van Patten



Intro Music 00:00



John Bellone 00:17

Welcome, everyone to Navigating Neuropsychology: A voyage into the depths of the brain and behavior, brought to you by INS. I'm John Bellone...



Ryan Van Patten 00:26

...and I'm Ryan Van Patten. Today we have our tenth clinical case presentation for you. One quick caveat about these case presentations: They're not meant to be fully exhaustive reviews of all important aspects of the case. So, for example, we

sometimes skim over relevant background information in the service of focusing our limited time on a few key aspects of the case where we think that the most deep learning can occur. In real world neuropsych evaluations, attention is paid to many details of each patient's background, history, and overall presentation. But, for these clinical cases, we want to release the episodes as Neuropsych Bites, which we try to keep to no more than 30 or 35 minutes. Therefore, we go for brevity and focus on a few key areas rather than talking exhaustively about each case. There are also a few other caveats to our clinical cases, which you can hear in the introduction to [episode #79](#).

John Bellone 01:27



Today's episode is a clinical case with Dr. Marc Norman about a 63-year-old woman with a history of stroke who may or may not be eligible for a heart transplant. Marc is a board certified neuropsychologist and a Professor of Psychiatry at UC San Diego. He is also the Executive Director of the International Neuropsychological Society, INS. This is an interesting and somewhat unique clinical case, and we hope that you enjoy it as much as we did. So, with that, we give you our conversation with Dr. Marc Norman.



Transition Music 01:59

Marc Norman 02:08

So what we're going to be talking about next is this 63-year-old, Black, right-handed woman who we saw as part of a heart advanced therapy evaluation. We work with a heart failure team - we work with four solid organ transplant programs and one of them is a heart program. This is a woman who's aged 63 and she was being considered for implantation or reimplantation of a device to help her heart versus going directly to transplant versus doing neither of those things, which I'll explain here shortly.



This woman has an underlying heart condition called non-ischemic cardiomyopathy and, in that kind of condition, what's affecting the heart is ischemia. There's a lack of blood flow to the heart, but she also has coronary artery disease and some other things. So what happens in her case is that the left side of the heart that contracts and pushes blood out into the arterial system was only functioning, the ejection fraction was only at about 10%. Because of this, a device was placed in her heart in October of 2015. It's a pump called a VAD, a ventricular assist device. It basically has continuous flow of blood through the left ventricle or bypassing the left ventricle out into the circulatory system. She had this implanted in October 2015. However, one of the big risk factors to these ventricular assistive devices is the risk of having

either GI or cerebral strokes. So this device was implanted in October 2015 and her brain was showered with an embolic stroke in December 2015. That is the situation that the team is looking at. I'll explain more about that in just a moment because that's a very important context to this.

What I will mention is that, in the course of her being evaluated by our team, I saw her three times at three different time points. Early on people thought, "She really has some cognitive issues." So the question, "Should we transplant her or do something now?" came up. Our options at that point are: "Should we go ahead and transplant somebody who has cognitive issues and we're still not sure how much she's going to recover from this stroke, from these multiple embolic strokes to her brain?" or "Should we wait and let her recover and see how much she's going to recover?" But, if you do that, she's still at risk of throwing more things up to her brain. If you're not very high functioning and you don't really recover much, the team may not want to transplant you. But if we wait, we put you at risk of having more events. Versus do we just go right down to transplant and then we may end up actually having somebody who doesn't rebound because they've already taken a hit to their cognitive reserve and now we're creating a problem or even worsening an issue that may be there? So it's a really tough situation to be in.

Medically, one of the things [is] that everybody who has one of these devices, if you listen to this story, you understand that clots can be a problem when we have devices like this. People are on antiplatelet therapy, on anticoagulation therapy, generally. If you have an ischemic event in your brain or you have a bleed, you have the potential of having a more catastrophic event. So we're really between a rock and a hard place in the decision making that comes. The team was really looking at "What do we think should happen in this case?" because it's a really tough situation to be in.

I'm going to back up a little bit now and talk a little bit more about her history. So, as I mentioned, she has coronary artery disease, hyperlipidemia, essential hypertension, and diabetes mellitus type 2. We're based in San Diego, but we have a large catchment area including some individuals out in Nevada. This woman happens to live in Las Vegas and that makes it a really complex issue because she needs someone to take care of her. Often people don't have the resources, the money, to stay locally with us. We do have some lower cost things, but that is a barrier sometimes of having individuals that can't take time from work or other things. Right now, this woman is in a situation where these things are tough, but she does have a caregiver that gave us some information, which ultimately becomes helpful.

I'll keep going on if you gentlemen don't mind and talk a little bit more about this. It's a very tough situation for the team to figure out what to do. This woman believes that she's getting much better. She's telling us she's quite active, she takes all her medications like she's supposed to. But in talking to her caregiver, we get a different picture. Her caregiver said, "No, she doesn't do the things that she just told you that she does. Sometimes she doesn't get up, I have to encourage her. I have to tell her to shower, I have to tell her to do something." She does it on her own, but she needs some initiation help for that. That's the big picture that we're looking at. Complicating this is that the family is also already overstretched. This woman is married, her husband remains in Las Vegas, but he has dementia. So the family is needing to help look after some of his affairs with that. She's got a nephew that can maybe help take care of her and him if she's in Vegas, but we need her in San Diego for a while. So it's just a very stretched support system that is there.

John Bellone 08:05



Yeah, Marc. Thanks for that background. There are a lot of moving pieces, it sounds like. She first had the left ventricular assist device in 2015 and she's been seen by you a few times since then. She also had a few embolic strokes in 2015 after that device was placed. I can't remember if you mentioned where those strokes landed, where they were in the brain?

Marc Norman 08:38



Yeah, I did not mention that. I'm going to actually back up for a second here to give a little bit more context to that. What happens with embolic strokes is these essentially can be clots, they can be other things that are in the vessel, but they become dislodged and travel. So what sometimes happens is these small clots, whether they be blood or atherosclerosis, they travel and they can go through larger vessels and then they get lodged in smaller vessels because they just can't get through there. What's not entirely clear is that [while] sometimes that can happen in your carotid system, this more likely than not may have happened in the device itself. That is one of the reasons, if the clot has devices, replacing the device may be a good option. But, again, we might just re clot another device and put her on more anticoagulation and then risk a bigger bleed, whether it's GI [or cerebral]. It's struggling here in that rock and hard place. What was found a couple months after implantation of her device, is that she had embolii in her left thalamus, her right cerebellum, and right basal ganglia.

John Bellone 09:50



Marc, did you see her before the LVAD was implanted?



Marc Norman 09:55

I did not actually.



John Bellone 09:56

Okay.



Marc Norman 09:56

Yes. So she had the device planted in October 2015, and then she had the embolii in December, and then I saw her the first week of January, so soon after.



John Bellone 10:10

Gotcha, thanks.

Ryan Van Patten 10:11

I want to talk more about the cardiac side of this being on a heart transplant team. This is very unique. Some neuropsychologists don't ever do this. But I just want to round out a few things. I'm going to run down a few areas I'm curious about. If they're unremarkable from our perspective, we can just say that and move on. But if you could quickly give us her educational history, if there's any psych history, any other medical and neuro history, substance use, sleep, legal issues that are relevant to this case, before we move on.



Marc Norman 10:44

Oh, sure, I would be happy to do that. This is kind of complicated. She was living at home before but her husband was in a nursing facility because he already needed care by that time. But in terms of her [history], she has no significant substance use or psychiatric issue. After the stroke, she feels that her quality of life has actually improved. One of the tension points that she had is that she thought her caregiver was overbearing and she didn't really trust her caregiver. I think part of that was her caregiver is trying to be very responsible and making sure she takes her medication and making sure she gets out. It takes a bit of a push and that bothered her at times because she thought she was doing well and she gets feedback that she's not doing well. So there was a certain tension there.



Ryan Van Patten 11:37

Got it. What about her educational history? What do we want to say?



Marc Norman 11:40

Oh, yeah. This is a woman that graduated from high school. There were no learning or other types of issues that we consider to impact her functioning.



Ryan Van Patten 11:51

Got it. No other psych or medical history that's relevant, aside from what we've already said, correct?



Marc Norman 11:57

Correct. My apologies, I meant to say that. She's never really been in treatment before. She really denied depression, anxiety. No psychiatric hospitalizations or issues with suicidal ideation or attempts.



Ryan Van Patten 12:13

I only have one more question before we move on which is about the situation with her caregiver and the patient's ability to complete ADLs. That seems to be somewhat contentious and unclear. I wonder if cognitively there's any interference with the ability to complete higher level activities of daily living, like remembering to take medications or being able to do finances or drive or things like that. You had mentioned there being a motivational issue and a dynamic of mistrust with a caregiver. Is there anything else you can say about ADLs?



Marc Norman 12:47

Yeah, you know, sometimes it's a challenge trying to discern what the problem is. What we did in this case to get information [that] she doesn't do it on her own. Trying to differentiate: Is an issue with initiation? Is this an issue with memory? Is this an issue with organization? Is this just somebody who doesn't want to take the medications? And so, ultimately, what we end up looking for when we're working with transplant teams is behavior. Is this happening or is this not happening? There's certainly a culture within our transplant teams that we want to see people do things independently. Now, is that actually necessary? Probably not. If somebody gets their medications into their mouth every day, does it really matter if somebody's telling them what to do? But we also know that there's not enough organs to go around. People die every day because there's simply not enough organs for organ transplant. So there's a lot of subjectivity.

There's a lot of cultural issues, both medical culture [and] North American culture, that go into this. Sometimes that's part of the conversation we need to have because we do get patients from other cultures and the caregiving role is very different. I don't think we should ever be imposing that upon other people. There's a

lot of subjectivity that goes into this. How we look at these issues are things that we often need to discuss as transplant teams.



John Bellone 14:15

Marc, correct me if I'm wrong, but the reason why ADLs, these activities of daily living, are more important, potentially, in these transplant cases is because there are many post-surgical tasks that have to be done and it could be life or death whether they manage them or not? Is that what you're saying?

Marc Norman 14:30

Yeah, you know, what you said is something that I didn't bring up, which is incredibly important. There's actually about one thousand things in what you just said. So, first of all, one of the reasons we're talking about what we are is because anytime something foreign is in you, like a new organ, your body wants to reject it. We have people on immunosuppression and you've got to take that. But when we suppress your immune system, we put you at higher risk of cancers, fungal infections, bacterial infections so medication is a huge part of what needs to happen. People need to take that [and] they need to remember to take it, people need to help them with that. Then medications will frequently change. People who have cognitive issues may not be able to keep up with the frequent changes. So that's part of it.



Now, another thing that you said, which is really important, is the idea of these ventricular assistive devices. These are basically devices that are implanted in the heart, and they can be in the right side or the left side or both sides of the heart, but they're probably more difficult to take care of than going straight to transplant. The reason for that is that there's an external wire that comes out from the body and is attached to a controller. The controller can speed up the pump speed or decrease the pump speed but it doesn't act in isolation, it's got to have power to it. So if you're walking around, you may have holsters under your armpits or under a belt that have batteries attached. You've got to treat those things appropriately. So if you are there and you go, "Oh, I need to switch my batteries out" and you disconnect both of them, your pump is going to stop. In that case, you can die. Somebody needs to have enough cognitive functioning to make sure that they don't disconnect both of their batteries. We also want people to be able to follow instructions because we don't want you ever sleeping on your batteries. If your batteries go dead, you may wake up in the same condition, so you need to not sleep on that. You've got to be able to keep a lot of information about how to care for your ventricular assist device, your VAD, so that you don't have problems. Taking pills every day is way easier than taking care of a VAD. The team is also appreciative of that particular issue, too.



Ryan Van Patten 16:51

This is great. This is such useful information, especially for those of us who haven't spent a lot of time in these transplant teams. I should have asked this earlier, Marc, but give us a big picture description. What is the role of neuropsychology on a transplant team like this?

Marc Norman 17:07

You know, what's really funny is we serve a lot of functions. I used to be in all of our meetings, we spend about six hours a week in transplant meetings, and the needs for each team are very different. We have an abdominal team, we have a kidney/pancreas transplant team and a liver transplant team; and then we have a cardiothoracic team, so lung transplant and then a heart transplant. But as I'm saying, it's not just heart transplant, there's VAD, their mechanical circulatory support or advanced therapies, that may be involved. With some populations, issues of narcotics to treat their pain may be relevant. For some, substance use. If we look at alcoholic cirrhosis, substance use is a much bigger issue. For those that may have developmental issues, if we think about things like cystic fibrosis, in that population in terms of eating, narcotic use is very different than, say, a kidney transplant team where [there are] other psychiatric issues and underlying conditions whether it be something like lupus. Those individuals are at higher risk for epilepsy, for strokes, for lupus cerebritis, encephalitis, vasculitis. All the teams are very, very different.



As we talked about our heart transplant team, we have things like strokes and bleeds that can come into the brain. But also there's a lot of nuances with a lot of these things. With our heart side and our lung side, we can have issues with blood getting oxygenated. Even if your heart is functioning perfectly and you're getting lots of blood flow, your brain may be perfused but you may be under oxygenated so you may be hypoxic. That's actually very different than having a lack of blood flow, your brain is simply not getting perfused. You can have all the oxygenation in the world, but if the blood isn't getting there, that's different. That actually plays a role with how I look at data and make a recommendation to a team and that comes up sometimes. Some of our patients have strokes, some have under oxygenation.

In our liver transplants, you can also get something called hepatic encephalopathy, which is sometimes largely related to ammonia. If we transplant you with hepatic encephalopathy, your cognition is going to look much better. But if your cognitive issue is actually due to alcohol issues that have irreversibly changed your brain, there's a potential we're going to make you worse. If you're older and you have an incipient neurodegenerative disease, we're going to make you worse. So there's a lot of nuance and we help the team with that. We are the ones in the room that

really are - you know, my department is psychiatry, so there's just as much of a chance I'm going to see somebody on a psychiatry consult if I'm on call as doing neuropsychology. We are their psychiatrists, we're their psychologists, the neuropsychologists for our teams. If they pull up neuroimaging, we're the ones in the room who read that to them. We play a lot of roles with our transplant teams. It's a lot of fun, but it's also a tremendous amount of responsibility.

John Bellone 20:24



Yeah. Clearly. Your role in this specific client's case, was to inform the team about general cognitive abilities and ability to manage the - no, she already had the LVAD. What was your specific role in this case?

Marc Norman 20:42



Well, all of that.

John Bellone 20:43



Yeah.

Marc Norman 20:43

In this case, what you're hearing are issues of adherence to some extent. So, you, as a neuropsychologist, you're thinking, "Well, is this related to one of her strokes? So it's an initiation issue? Where are we in time of her recovery? Is this something that may improve over time? Or is it another behavioral issue that she just has the personality of someone who's not going to take medication?" There's that whole side of things. But, ultimately, what our teams in this kind of case are saying [is], "What should we do?" We're not a consultant to the team, we're part of the team. So, the 5, 6, 7 cardiologists will say, "This is what I think." They're looking for the exact same thing with us. "What do you think we should do?" They can't be - [laughs] and believe me, I've had my colleagues say this, "This isn't a 50/50. Are you 51, or 49.9?" Because you either cut or you don't cut, there isn't a middle ground here. You can't be, "Well, here's the pros and here's the cons." You're part of the team and you've got to have an opinion. I don't always have an opinion, I don't want to make it sound like that. But there are times where we do have to have an opinion about what's going to happen. That's our role.



John Bellone 21:58



Remind me, for this evaluation that you're doing, the repeat evaluation, what was the decision that needed to be made?

Marc Norman 22:04

Do we go ahead and just transplant her now at that point? The earliest time when I saw her, in January, she was not very responsive. She was clearly brighter and more interactive when I saw her subsequently, but she still had lots of issues which evolved over time. So the issue is: Should we go to transplant now? Should we replace her VAD and give her longer? I don't have much of an opinion on that. Or should we not do anything? This is how she is and we need to not make her worse in any way.



I'm going to use a different term now. Sometimes we put a VAD in and it either could be the right or the left side of your heart. If it's so bad you're not going to live long enough to get a transplant, that VAD we call a "bridge to transplant". It's to bridge you from where you are now to getting a transplant later. Now, in other cases, if you're much older or you have significant issues where your outcome from surgery is not going to be high, we can do what's called "destination therapy". This is your final destination. In her case, do we go to transplant now? Do we put another VAD in her? Or do we use this as destination therapy and we're done, this is going to be her ultimate status?



John Bellone 23:29

Great. Thanks for the clarification.



Marc Norman 23:31

Sure.



Ryan Van Patten 23:32

So what did you find with your testing?

Marc Norman 23:35

So with our testing, I'll talk more about the later testing with her, she was really quite low. The very first time I saw her, she couldn't even participate in testing. She subsequently got better and better. This is what happens sometimes. We can make one of three decisions with people - we list them for transplant and there's some nuance to that, which I'll mention in a moment; we decline them for transplant; or we defer a decision. So when I saw her in that January 2016 timeframe, we could say, "Well, we accept her and we're going to go ahead and list her for transplant", which would not be a good idea for somebody who can't really respond very well. "We are going to decline her," but she's in a very early stage of recovery, so that doesn't sound like a very good idea either. Or we can defer someone and say,



"We're not going to make a decision. Let's look at her later on and make a decision."

Now, one of the other options with the first thing of listing someone is we can put them into what's called Listing but Status 7. So they're on a hold. They're actively listed, but they're on a hold. We're not going to draw any organ offers for them at that point. We all realize this is not the time to transplant this woman. Let's give her some time to recover. Again, as a neuropsychologist, you can help the transplant team understand that. They're going to ask, "How much better is she going to be? How long is it going to take?" And these are the kinds of things that neuropsychologists are perfectly situated for talking about. "Yeah, I don't know." [laughs] "I don't know how long this is going to be or how much more." This is the answer to that question.

When we tested her much later on, just kind of broadly, we actually gave her a DRS [Dementia Rating Scale]. She's young, but we wanted to give some things that we might see some minor changes. Her DRS was still 124, and this was her probably at the best time that we saw her. But things like Trail Making were not that bad. Just kind of mildly bad on Trails A. Her Trails B was a T score of 40, so one standard deviation [below the mean]. She's clearly better now at doing things. Her category fluency and letter fluency were both just over two standard deviations below. So not so great. With that, her memory score - we gave her the CVLT short form - her learning on that was actually a T score of 35. So, clearly, she was learning some things, but her delayed recall was much worse. On her long delay, she only recalled 1 out of 9 words. So there's clearly some memory issues that are going on there. Her learning was around - I said 35, I think, before - it was a [T score of] 34. So she's clearly not getting some information, it's being lost over time.

Is she going to continue to get better? Probably. How long will that take? I don't know. How much will she improve? I'm not sure. There's clearly still some cognitive issues going on. Part of that may be due to that thalamic lesion that's there. So there are some reasons that she doesn't look great and, again, this is complicated by the perfusion and potentially oxygenation to her brain. She has some things that are just not in her favor, even as she's recovering from this vascular event.



John Bellone 27:03

What did you guys end up deciding?



Marc Norman 27:04

I don't know, what do you want to do?



John Bellone 27:06

[laughs]



Ryan Van Patten 27:06

[laughs]

Marc Norman 27:08

When I present this case or when I talk to people about it, it is never about the actual decision that was made. It's about the process of decision making. There's no bright line here, there's nothing to say that "You should do this" or "You shouldn't do it." You're always going to get people on the team who say, "Yes, let's go ahead and do this." And you'll always get people on the team who say, "No, we shouldn't do this." And you'll get some people with all other kinds of viewpoints in there. So it's never about the - well, let me rephrase that. With due respect to all of our patients, it's always about the ultimate decision that's made. But in terms of a team, it's really about the process.



I actually don't even remember. I can definitely tell you in January when I first saw her, [I said] "This is not a good idea, let's not move to transplant because I can't tell you [if] we're going to make her worse and she's not going to really have recovery, or she's going to get much better." As we move on there's certainly some issues that I'm concerned about, but part of this, again, is not just about the cognitive data. Okay? Part of this is the surgical issue. Is she going to make it out of the OR? What is the risk with that? Part of it is about the social situation - Are these caregivers going to commit to being here? Are they going to be able to commit to taking care of her? What if she never gets better, cognitively? Is something going to be in place for her, even as her husband continues to progressively get worse with a neurodegenerative disease? So focusing on [whether] we said yes or no isn't really the main point of this. It's really about the process and integrating all of these pieces, including the imaging and all of the other data that we have. That's a lot of words to not answer your question.



Ryan Van Patten 29:00

[laughs]



John Bellone 29:00

[laughs]

Ryan Van Patten 29:00



One aspect we haven't touched on yet is the supply and demand of transplant of internal organs. I don't know, does that impact you? Are you aware of that when you're making these decisions? Like imagine you decide to do the transplant, there must be a heart in order for this to be done. I know this is part of the marketplace for organs, do we have enough? People die because we don't have enough and we have to be very selective about who they're given to based on criteria. It's very difficult. Does that come into play in your decision making process?

Marc Norman 29:39



Fortunately and unfortunately, no, to some extent. Our only real decision is, do we list them, do we decline, or do we defer? That's it. But your question is very fair. We're not looking at how many organs we have available. It can be in people's thoughts but it's never a discussion that we have. Its, "What is the potential outcome for this person, both short term and long term?" That's pretty much it. Now, the nuances to this are exactly what you said. We know that about 20% of people would die while awaiting a liver transplant. That's a huge number of people. That means that we have a responsibility of allocating organs in a responsible manner. The organs are also different. Certainly, you can't live without a liver, you can't live without lungs, you can't live without a heart. However, you don't need any kidneys to survive because we have replacement by using dialysis. Now, dialysis, we can only use to a certain extent as long as we have access to be able to do dialysis. But in cases where we have behavioral issues or we have other medical issues, we can keep somebody on dialysis so the press for that isn't quite as urgent. We can find living donors for some individuals. So, again, the organs are different and the calculus is a bit different in how we think about things. It's a really big world of transplant, and the teams have very different conversations because the issues are very different. That's why it's fun from my perspective that the words that are used and the nuances are all different between the four solid organ transplant teams.

John Bellone 31:26



Those are great points. Was there anything else you wanted to say about this case before we wrap up?

Marc Norman 31:32



No. I just think that you both touched on some of the critical things. Well, one is that we're working with people. We want to do what's in the best interest of our patients and their families and sometimes those decisions are really difficult. We have very difficult conversations with family sometimes. With children saying, "Well, if none of you can be here to take care of your loved one, they're going to die. We can't list

them if you can't commit to that." When you're dealing with people, like your age, where they say, "Well, if I don't work, I can't feed my family. I can't afford to pay my mortgage." What a horrible position to put people in. But that is part of sometimes the health disparities as of having resources and being able to afford copays. This is a really complex world in terms of organ transplant. It's really wonderful being in this kind of role when we can have this larger picture of social issues, of cultural issues, of cognitive issues, of psychiatric issues to be able to integrate that. I think that's the great value that we hold with our transplant teams.



John Bellone 32:42

Yeah, well said, Well, Marc, we had wanted to have you on for quite a while and you didn't disappoint. I knew you wouldn't, I knew you wouldn't. [laughs]



Marc Norman 32:51

You're overly kind. But thank you so much for this very generous offer and this opportunity. If I may say, you both have done such an incredible job and have such a loyal group of people. I mean, I get a lot of respect just [from] the fact that I know you two and I've met you two before. People freak out when they come to my office and they see something that says NavNeuro in there. I can just speak on behalf of the INS and we're so grateful for our partnership that we have because it's so beneficial to us. Our board of directors and our membership really appreciate all that you do for neuropsychology and disseminating information. You do it in such a wonderful way. So thank you both so much for all the work that you're doing.



John Bellone 33:37

Oh, that's so nice of you.



Ryan Van Patten 33:38

Very kind words. Thank you, Marc. You've been so instrumental to the partnership. As you know, the three of us have been having conversations and working together for years now. You've been a big supporter of ours for a long time. We really appreciate it.



John Bellone 33:53

Yeah. You'll also be a rock star now that you've been on the podcast. [laughs]



Ryan Van Patten 33:56

[laughs]



Marc Norman 33:57

No, let me make it very clear. None of my trainees will ever say that I'm a rock star. I had one almost lose her mind when she found out that I knew you guys.



John Bellone 34:03

[laughs]



Marc Norman 34:06

Yeah, yeah. It's like the Beatles. You're walking around, you just need to get your mop-tops to grow in there. Yeah, you'll be up there.



Ryan Van Patten 34:13

[laughs]



John Bellone 34:15

All right. I think that was enough praise for one day. [laughs]



Marc Norman 34:18

[laughs] Okay.



John Bellone 34:18

Thank you, Marc. Thank you again.



Marc Norman 34:20

Okay. Thank you.



Ryan Van Patten 34:20

Great to see you.



Marc Norman 34:21

Take care.



Transition Music 34:22



John Bellone 34:26

Well, that does it for our conversation with Marc. As always, thanks so much for listening, and join us next time as we continue to navigate the brain and behavior.



Exit Music 34:35



John Bellone 35:00

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Ryan Van Patten 35:11

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