



Deep Brain Stimulation Series

A Talk with a Movement Disorder Specialist and Neurosurgeon about DBS

Davis Phinney Foundation

Note: This is not a flawless, word-for-word transcript, but it's close

Melani Dizon (Director of Content and Education, Davis Phinney Foundation):

All right. Well Dr. Wang, can you please introduce yourself? Tell us who you are, where you work, and what line of work you're doing.

Doris Wang, MD, Ph.D. (Neurosurgeon, UCSF Movement Disorders and Neuromodulation Center):

Sure. My name is Doris Wang. I am a functional neurosurgeon at UCSF. I specialize in implanting DBS in patients with movement disorders and also treat them with ablative therapies.

Melani Dizon:

Okay, great. And Dr. Ostrem, how about you?

Jill Ostrem, MD (Medical Director and Division Chief, UCSF Movement Disorders and Neuromodulation Center):

Hi, yes. My name is Jill Ostrem. I'm a movement disorder specialist, and I've been working at UCSF now for about 19 years, and I helped to direct the Movement Disorder Center there. And yeah, I've been involved with deep brain stimulation therapy for a long time.

Melani Dizon:

Okay, great. And so, it seems like you two work together quite often.

Jill Ostrem:

We do.

Melani Dizon:

Yes. Great. Well, I'm really excited to be able to have this conversation. We have so many people in our community interested in DBS and trying to understand what the process is like and how sort of that process is between thinking about it and actually having it done. So, Dr. Ostrem, can you explain what DBS is for people who've never really don't know much about deep brain stimulation?

Jill Ostrem:

Sure, yeah. And deep brain stimulation is a therapy that we can use to help people with movement disorders, and specifically, in Parkinson's disease, they can be very useful in treating some of the motor problems that come, especially like more, you know, after medications aren't, aren't covering the symptoms all the time throughout the day. And it involves placing an electrode into some of the motor nuclei of in the brain in deep structures of the brain. And it's connected to a battery that sits in the chest wall. the whole device is in within the body. It's sort of like a brain pacemaker, you can kind of imagine. And we can communicate with the device through the skin using our physician programmers and patient programmers, and we can adjust the stimulation to kind of tailor the amount that's given for specific symptoms and for an individual patient's needs. And you know, it can have really powerful effects on some of the symptoms. So, we're really, we're so lucky that we have this as a therapy we can offer patients because it can really relieve a lot of suffering and improve quality of life.

Melani Dizon:

Yeah. So, what are some of the symptoms specifically that it helps the most with?

Jill Ostrem:

Yeah, so it can help a lot of the cardinal motor features of Parkinson's disease. So, we talk about, I know rest tremor or even action tremor, but rest tremor is more, more classic. It can also help with the slowness of movement or bradykinesia. It improves, it improves rigidity. And it works kind of all the time, right? So, because the energy is available to the brain, to adjust the brain rhythms, you know, it's, it's kind of working for you all the time. So, you don't have the ups and downs that you can get with medications as the medication's wearing off with DBS. It's just kind of giving you consistent treatment of those things. And then the other thing it really can do is it can help dyskinesia those involuntary movements that sometimes medications result, you know, in Parkinson's over time and people can take less medication, which is nice too. So, things that, it doesn't help as much are, you know, cognition which can be more of later-stage symptoms sometimes for Parkinson's patients. It doesn't help, you know, balance or freezing of gait very much. So those are some symptoms that, and a lot of the non-motor symptoms are not well treated. I mean, like we'll see some improvement in things in that, in that, those domains. But mostly it's, it's there to treat the motor symptoms that I kind of mentioned.

Melani Dizon:

And if you said it doesn't help those, but are there things that actually makes it worse? We're going to talk a lot about like sort of the leads and where they could go and how those are impacted. But Dr. Ostrem is there, are there things that it makes worse?

Jill Ostrem:

Well, if the deep brain stimulation electrode is not in the right place, you know, that would, that can lead to, you know, more problems. So, you want to make sure that the stimulation is on is not also too high. So, you know, you want to keep the stimulation and the energy in the right area of the brain that's controlling the motor symptoms and not having it spread other places. And then, you know, I think there are situations where even if the electro is placed, ideally you can still have, you know, sometimes some, some symptoms that, you know, that emerge that you want to address. But again, remember deep brain stimulation is, you know, largely a reversible therapy. You can turn it off, you can adjust the stimulation, which is great. And so, a lot of those unwanted symptoms that can, you know, happen but are rarer can be addressed by just changes in this settings often.

Melani Dizon:

Okay. I would say that the most common symptom that people tell us get worse is their voice and speaking is that that's pretty common.

Jill Ostrem:

Yeah, so there are, you know, depending on the target in the brain, you have speech fibers that can be nearby and so if you have stimulation spreading into those speech fibers, sometimes you can have kind of a tight quality tier speech. But there are lots of issues with speech and Parkinson's disease. And so, when people say their speech is worse, you know, it, there are a lot to sort out. Maybe, you know, people can even have problems with their speech just from disease progression. Hypophonia, you know, real soft voice that's a little bit different than when we have stimulation changes from affecting voice. So, there are a lot we need to sort out. But you're right, I guess speech sometimes can be a little bit worse and even, even for reasons we don't fully understand. But, but most of the time you know, you, if things are manageable, you don't have a lot of changes as a result of the stimulation or the surgery on speech, in my opinion.

Melani Dizon:

Okay. And then I promise we'll get to you Dr. Wang. The question about what makes a really good candidate for DBS in the past I think there was this idea that we're going to wait a little bit longer. What is the sort of standard these days in terms of maybe people with later onset Parkinson's and also YOPD people with young onset Parkinson's, and in the past it seems that it was always, you know, you have to have, you need to be responding well to Carbidopa-Levodopa, but it seems like that's not necessarily the case, especially with some YOPD people. So, can you speak to those a little bit?

Jill Ostrem:

Well, candidacy for DBS is complicated and it's really important that, you know, when you, when you're considering the surgery, that you work with the team that you know, is really experienced, and can consider all the different factors that go into whether someone is a candidate for surgery or not. But you're right, I think we've been doing the surgery now a long time and we have a lot more experience now to appreciate, you know, who would really benefit. And also, those, the side effects and complications of surgery are, you know, have really gone down. It's a pretty safe surgery, so it's changed the risk-benefit ratio I think over time. And so, but, but most people would still agree that if you're not having any disability or any motor fluctuations, you know, you really don't need to think about DBS.

We don't have any evidence to suggest it's neuroprotective yet or anything like that. Maybe we will, but we don't have that evidence right now. And so really it's when people have a disability that is starting to build from, you know, not being able to control motor their motor fluctuations. And you know, there are some issues with the medications and that can be different for everyone. And, you know, some people really don't tolerate medication very well. Even if they get a great levodopa response, perhaps they have other problems from levodopa or just take the timing of the medication as difficult for them to remember. I mean, there can be lots of reasons why people don't want to rely only on the medication anymore to help their symptoms. Tremor is also a symptom that is, you know, really responsive to DBS and so some people have more tremor than others that is, and that tremor can be very difficult to completely treat with medication.

And so sometimes that's another reason to go with an earlier surgery kind of plan, right? When, when the tremor is just really refractory. And then people that are younger who, who may inevitably get, you know, motor fluctuation just because they're young and you know, it's coming and eventually, you know, why wait, you know, there is kind of that sense of like, you know, when you're younger you'd be yelled to tolerate the surgery better anyway, but, but all these things need to be carefully considered and discussed with the team and, you know, make sure you have good family support and all of that. But yeah, there, there is a sense that, you know, moving DBS earlier, you know, in the kind of timeline of someone's experience with Parkinson's is the right thing to do.

Melani Dizon:

Okay. And then is when somebody comes to you and they're a patient of yours and you've been treating them and you think it's time and maybe they should consider DBS, how much choice do they have in terms of what type of DBS device to get what company to go for?

Jill Ostrem:

Yeah, I mean, the market is constantly changing. You know, we're so lucky now to have all these different you know, folks in the arena now with, with three different commercial devices even just here in the US and they're always changing the features and the equipment, and you know,

the device itself. So, you know, Doris and I are always trying to stay up on like what we recommend, but you know, they're all really excellent systems. Certainly, patients are aware of these different, you know, systems now too and sometimes weigh in. There are a couple things that really help us I think right now is just whether someone is capable of recharging their device or whether or not they would rather not have a rechargeable device and just get a battery replacement, you know, in two to three years or something. So that helps us to kind of recommend what device sometimes we would rec we would go with. But patients are a part of the conversation too.

Melani Dizon:

Okay. So, Dr. Wang, about how many DBS surgeries have you done?

Doris Wang:

I actually just tallied it up this morning, so on my own I've implanted about 150 new D v s implants, excluding battery changes and, you know, second-stage surgeries.

Melani Dizon:

Okay. And let's talk a little bit about Medtronic's. So, can you talk to us about them, about their devices and why you believe in the efficacy of these devices?

Doris Wang:

Medtronic specifically? Yes. So yeah, you know, they've been in the market for the long-time longest time, and I would say, you know, in the last five years they're really coming up with really novel devices. One thing that's super exciting, I think for both Dr. Ostrem and me and our center, in general, is the ability to actually sense and record bring activity besides just sending unilateral directional you know, stimulation to the brain. So, in the past, DBS has always worked by just, you know, sending constant stimulation. But as we know and learn more about the disease state the brain is a shifting thing and it changes all the time. Symptoms fluctuate, you know, depending on the medication cycle, depending on the time of the day. So sometimes a patient probably doesn't need as much stimulation. As, you know, Dr. Ostrem just mentioned sometimes stimulation could lead to side effects, for instance. So, it's really remarkable now we have the ability to actually listen to what the brain is doing and adjust stimulation based on the brain states. So, I think that's one thing that's super exciting.

Melani Dizon:

So, and that's what they called adaptive DBS, correct?

Doris Wang:

Exactly. Adaptive closed-loop DBS. So, adjusting stimulation based on symptoms, and again, it's not out yet, but you know, this, the device out now, the Vercise, has the ability to do that down in the future, down in the line.

Melani Dizon:

Okay. And what kind of battery does the Medtronic device use? And you know, further, than that, what is important for people with Parkinson's to know about batteries, like pros and cons, fixed, rechargeable and replacing and all that kind of stuff?

Doris Wang:

Right. So besides, you know, all these fancier features, I think one basic thing, as Dr. Ostrem mentioned, is whether a patient wants to deal with a rechargeable battery, which lasts 15 years, then Amy needs to be replaced versus a non-rechargeable battery that lasts, depends on their stimulation setting anywhere from, you know, two years to maybe five years. And there are pros and cons to both, I would say, you know, for somebody who's younger, probably battery that lasts longer, so they don't need to come back as often for recharging or for, for battery replacement surgeries, you know that prevents infection and such would be preferable, but then it takes more daily maintenance. Right? So, then that means they have to recharge their battery, make sure it's tanked up and they do that, you know, depending on their usage every day versus, you know, a couple of times a week. And that can be quite a burden on some patients. So, in some of the other patients, you know, if they don't want to have to deal with bringing x-ray equipment with them when they travel or dealing with the burden of recharging their device, then a non-rechargeable device would be preferable.

Melani Dizon:

Okay. When they recharge it, can they be moving around as they're recharging it, or do they have to be, sit still tied up to something?

Doris Wang:

Yeah, so now they do have the wireless rechargeable so they could theoretically move around. But the thing is the battery the charger has to be placed pretty much right above the battery to make sure there is good coupling. So they can't be, you know, say exercising for instance. Right.

Melani Dizon:

But-

Doris Wang:

Yeah, they sit around and watch TV and read while they're recharging their

Melani Dizon:

What is the difference, Dr. Wang, about with sleep and awake DBS? I think, you know when I interviewed people even five years ago, it was almost everything was awake. But now more, and more times it's happening to be asleep. So, can you talk about the two differences there and then why you would pick one over the other?

Doris Wang:

Absolutely. So awake surgery just means that patient, you know, doesn't get general anesthesia and that they're awake. When we do testing and recording asleep is done with patients under complete general anesthesia, so they don't need to participate in any part of the surgery or exam. In terms of, you know, why we have better, I guess, sleep techniques now is that we have all these great interventions and technology, you know, allow us to visualize as the DBS lead is going to the brain. So, we can take serial, almost Real-time images in the MR Magnet, for instance, to get super high accuracy. And in fact, you know the asleep MR-guided surgery is more accurate compared to the awake surgery. So therefore, since we know where the lead is going to end up, then we don't need the patient to be awake and doing all the testing.

And that really opens the door for a lot of patients who may have, you know, qualms about being awake during surgery who may be uncomfortable, you know, just based on anxiety, fear of awake surgery. And thirdly with awake surgery, we typically have patients come off of their medication because we want to see them kind of their most, I guess the worst motor state. So, then we can actually see the benefit of stimulation with our intraoperative testing. So, for a lot of patients that can be super uncomfortable because they're rigid, they may have painful dystonia, or muscle cramping so the sleep in that sense is really nice. They can still take their medicine basically right upon the time they get surgery and get it right out.

Melani Dizon:

So, when they, when, if they do have to go off of it, is it days, many days before that they have to go off or is it just 12 hours? Okay.

Doris Wang:

Usually 12 hours. And then I guess for some patients, you know, they actually want to see the efficacy. So then for those patients, you know, they prefer awake surgery So we kind of, you know, I kind of guide the patients just from my sense of whether somebody will be able to tolerate awake versus a sleep surgery. And a lot of it is also, you know, patients are involved in that conversation. and they'll let me know which method they prefer.

Melani Dizon:

Yeah. Would you, what would you say your breakdown is at this point of 50-50?

Doris Wang:

Slightly, actually more awake than asleep, but aid, and you know, also depends on what I'm treating the patients for. So, if I'm targeting deep nuclei for Parkinson's disease or dystonia those are MR visible targets, so we can see really well. But for, you know, an essential tremor that NCLs is not really well visualized on typical m r sequences. Okay. So, for e tremor, I do all those away still.

Melani Dizon:

Okay. So, can you talk to us about what happens when the person comes into the hospital for surgery that day? What actually happens to them, and can you talk a little bit about the different targets and what they help with, and why you pick different targets?

Doris Wang:

Right. So, by the time a patient is determined to be a candidate for surgery, and you know, we book them for surgery, we've already decided on., you know, the target. based on our multidisciplinary discussion. So, with, you know, their feeding movement disorder, neurologists taking into consideration their neuro-psychological testing, those are really important factors in determining target choice GPI versus S T M for Parkinson's. And then and we also determine, you know, whether based on patient preference and other factors whether to do a sleep versus a wake. because the workflow is very different. And then in, and whether we do both leads in one surgery, so implant both sides in one surgery or staging them, so implanting one side, let them recover a few months and then come back and implant the second side later. So, I guess when once a patient comes in, they usually, you know, go to preoperative.

Melani Dizon:

Area. Can we actually, you mentioned it, can we talk about the difference between if you're going to go awake or asleep and what the process is different, you just said? Yeah,

Doris Wang:

Right, right. So, for awake surgery you know, I guess the difference is that I implant both the brain lead and then lead extension. So that's a connection wire and the battery all in one day. So, they get all their hardware implanted one day. So that's the main difference. Whereas the sleep surgery because I'm operating inside a magnet, I can only have the right equipment to implant the brain lead for one surgery, and then they come back as an outpatient to get the connection wire and the battery in place. So, the surgery's kind of split over two days.

Melani Dizon:

Okay. So that might also be a reason that people might choose one over the other two, like to just let's just get it all done at once kind of thing? Exactly.

Doris Wang:

Yeah. So, for patients traveling from far away, for instance, I think I see a higher preference for the awake procedure if they can tolerate it. Yeah. So, so yeah, that's another reason. And then in terms of, you know, kind of hospitalization patients typically stay, you know, one night, maybe two nights in the hospital with the asleep because it's a shorter surgery and it's very minimally invasive and quick. Yeah, usually they get out by post-op day one and whereas the awake surgery, you know, because they're awake for testing, there are usually more air entrapment in the brain, you know, during the surgery. And because I'm doing more surgery, implanting other things that might slightly be more uncomfortable typically I would say two days in the hospital, but otherwise a recovery process is the same.

Melani Dizon:

And then, so Dr. Ostrem, I assume you are a part of the big team that is deciding what targets, so can you talk about the two targets for Parkinson's and why you pick one over the other, or?

Jill Ostrem:

Sure. Yeah. This has been a debate, you know, for, I guess since DBS was really around, I mean, so the Europeans would often I implant the subthalamic nucleus and then the US groups, you know, started to advocate more for the globus pallidus as a target as well. But both targets really are, are very useful for treating the motor symptoms of Parkinson's disease. There are some subtle differences now that we appreciate across the two targets, you know, after doing many, many studies for years. And you know, the subthalamic nucleus, you know, is a, is a smaller nucleus in the brain and there are other structures around it. So, it tends to be you know, there, there can be spread of stimulation outside of it, you know, with, with some, you know, more ease if you're not, you know, really careful.

And so sometimes people can have some behavioral changes or sometimes some cognitive changes with this nucleus implanted especially people who are vulnerable. So, and also people who are, have a lot of significant motor fluctuations who we call them brittle, brittle dyskinesic, where they, you know, take just a half a dose of cinnamon, and get dyskinesia, for example, the subthalamic nucleus, you know, can sometimes be kind of a hot area where, you know, stimulating there can be can, can generate dyskinesia. And so, we sometimes don't want to implant in that, in that kind of situation with the subthalamic nucleus. But it can really help people to lower medication, which is great. And I think there are like a lot of experience using that target and targeting that nucleus, too, with neuro functional neurosurgeons. So, it's a very good target as is, and then the globus pallidus, you know, it's a larger brain structure.

It like I said, it, you know, it doesn't have quite as many, you know, pathways right next to it that we can you know, affect. So, and we often don't have to reduce medication as much. It doesn't lead to dyskinesia as much when you stimulate in that area. So, we sometimes will recommend that nuclei if someone is a little bit older, maybe, well, you have some cognitive impairment someone who has, you know, a lot of dyskinesia this and someone who doesn't need to lower their medication as much, you know, so that then we might go with that nucleus. So, you know, but it's always a conversation and we, you know, take into account you know, all the things that are important to having our neuro-psych psychologist weigh in. Sometimes it's also, you know, anatomically impossible to get to one of these nuclei because it's some structural thing that Dr. Wang will show. You know, there is just a vein in the way or something that wouldn't be safe. So, all these things need to be considered, to make recommendations to someone.

Melani Dizon:

And Dr. Wang, do you think it's pretty split 50-50 in terms of the targets or is there one target you tend to use more?

Doris Wang:

I think at our center we tend to pick GPI as a target. I think it just based on our patient population, a lot of them tend to be older have some of these comorbidities like mild cognitive impairments. So, so for the reason that Dr. Astra mentioned, I think we kind of lean towards GPI as a target. It's so interesting you say that. I would not have said that we are that heavily leaning yet, but maybe we'll have to look at our numbers. Yeah, yeah, I was just looking at our GP versus TN numbers.

Jill Ostrem:

Yeah, I mean we're definitely we definitely do implant a lot of GPI, but you know, there are some young, a younger person too. Maybe we would also favor TN. So, it just depends. Yeah

Melani Dizon:

And then how does your relationship work? Is it you know, you've decided, hey, I think this is a good thing to think about the deep brain stimulation, Dr. Ostrem, and then the whole team comes together. Dr. Wang, you, the neuro psych, anybody who else is on that team?

Jill Ostrem:

Yeah, we have a huge team. We're lucky at UCSF. We have, you know, nurses that also help us in our pre-op assessment who will do a lot of counseling with patients who also do our on and off-medication motor assessments and videotape them. We do a lot. We also have a lot of

trainees that may have met the patient along the way. And so, we like to include them in the conversation as well. Some programs will also include physical therapists or speech therapists, you know, in they're their assessments. Usually, we don't have as much input from them in our multidisciplinary meeting, but, if they have seen them and we read their notes, we could weigh in on that as well. And then we have a psychiatrist as, which we're also fortunate to work with. So, you know, if there is something psychiatric going on, then, then she would also be able to share what she thinks.

Doris Wang:

And then after a patient finishes the whole evaluation process. And when you have a team conference where, you know, every stakeholder I'll move a disorder, neurologist, neurosurgeon neuro-psychologist, psychiatrist, I'll weigh in kind of on, on the final decision making.

Melani Dizon:

Okay. Are there ethical decisions or ethical components to this? And if so, what are they?

Jill Ostrem:

Well, I mean, I mean I think in general medicine you're always wanting to, you know, make sure people are really informed and also I think just to, you know, understand who's going to be a part of their support system and who we can communicate with to make sure that they're comfortable. You know because they may need some extra support after surgery. You know, and most it's, I think it comes around the consenting and if someone is, has memory issues or something, you want to make sure that they're really understanding what they're, what they're agreeing to. And we have a lot of clinical trials we also do at UCSF, which has been I think really important to help move the field forward. And so that kind of comes with its whole other, you know, consenting process and understanding, you know, what is app, what does it consider, you know, on label versus something off label. So, so that's important too. I don't know. What else do you think Dr. Wang?

Doris Wang:

I think it will cover most of the points. Yeah, I guess a lot of times sometimes it's like, you know, kid relatives of a patient kind of pushing to get the surgery done and then we just need to make sure everyone is on the same page and that, you know, it's not just a caretaker who's really making the decision.

Melani Dizon:

Right. What would you say? Well, like when it, when maybe it doesn't go the way the patient expected. What, what is, what, what, what's normally going on when they, like at the end of

the day and they, a month later they come back and they're like, I wish I hadn't done this. This is not working; I don't like what's going on. Usually

Doris Wang:

One the things well first of all, you know, we try to address making sure that our programming is optimized and with DBS, you know, you kind of hope for the slam dunk, but it may take several months, even up to a year or two, get, you know, the full benefit and fine-tuning. So, we kind of work with them to see what aspects or symptoms that's bothering them, and what can be treated. And one thing, I think one huge thing is about setting expectations. So, during our preoperative evaluation, you know, we try to be as honest as possible in guiding them, okay, this aspect of your symptom is likely to improve with DBS and this is not, so to kind of avoid these disappointing outcomes in some respects. And then I also think a patient's kind of neuro-psychiatric state plays a huge, huge role in this. So those are kind of my 2 cents.

Melani Dizon:

Yeah. Anything to add to that, Dr. Ostrem?

Jill Ostrem:

Yeah, I mean, I think it's, it's fascinating just to appreciate this question. And I think the field is, it's still not completely we haven't really studied this that much, you know, so kind of hearing from like kind of our personal experience, what it's like, but yeah, when people agree to have DBS you know, they often have, have a high expectations. I think that this is going to really improve a lot of their symptoms. And so just like we are hearing, like we try to talk about beforehand what will be better and what may not get better. And for some of them, we just don't know for sure what will for sure get better or not, or how much it'll get better. But everyone still hopes that you know, they'll, they're going to feel a lot better.

And because otherwise, you know, to go through something like this, you know, they are just expecting a lot. And so, kind of trying to figure out like when you're optimized, you know, when are you done adjusting the DBS, you know, there is always something you can change and tweak and like, and so you can get into a state where you're just always chronically unhappy because you're hoping for something more. So yeah, you really do need to you know, com work with people to communicate with, you know, what is realistic and, and when, you know, you're, you're kind of pretty much there, you know so that people can just kind of also accept, you know, this is my new normal, this is what, this is my new state really, you know, rather than continuing to just worry and think about, you know, could I get another 1% better?

Right? So, like I think that that's something that the field hasn't really talked about it and now we have these new systems that are may awesome and amazing, they can allow us to change stimulation in even more granular ways. But, you know, it also then, you know, people think, oh

wow, you know, I I'm going to be even better now because I have this new device, or I have, you know, the adoptive DBS is coming, and I'll be so much better. We, you know, maybe, but maybe not. So, I think you know, there, there are, it isn't a cure, you know, it is not a cure and I think people sometimes think it's going to be, and the difference, the outcomes from DBS can be pretty different. So, you can have someone who's really had an amazing change, right? And other, and someone else who maybe didn't. And so, it's just Parkinson's disease is not all one disease. It's different. And so, you know, just because you talked to your one friend and your support group who had a great outcome doesn't mean you're going to have exactly the same experience. So, a lot of this just needs to, you know, a lot of time and counseling and being with people and explaining is really, really critical.

Melani Dizon:

Yeah. I think that that's definitely a frustration, right? Like they just, somebody is like, I, oh my gosh, I was considered the perfect candidate. Everything was in line, this seemed to be the right thing and they just are having a terrible time. I'm thinking of one person in particular, she's just two years out and it's just miserable. Yeah. But you did say that, you know, this is reversible, right? So, there is that option of just completely correcting it off.

Jill Ostrem:

And there are some people who, you know, it's sort of a different category, you know, where they're, where you really, you know, are not getting the kind of outcome that you did expect, right? Right. And so that really makes you know, really look, look back and say, okay, let's just double check here and make sure the electrodes are in the right place, the programming is done correctly. Did we get the diagnosis right? I mean, sometimes that can be a factor. You know, are there any electrical issues with the system? This is when we get into troubleshooting. And so, you know, when, when there are situations where, where something just doesn't quite line up with what we would expect, that that does require a deeper dive into what's going on.

Melani Dizon:

Yeah. So, any, is there any difference between men and women with DBS and either of you can answer this, like any, any difference in terms of their reaction to it?

Jill Ostrem:

I don't know. I could try to stay. I mean, I think that that also has not been well studied. You know, women generally are, have smaller body mass, and maybe more prone to dyskinesia. And they are also, I think, are less likely to have DBS for reasons we don't fully understand. Hmm. But there are more men with Parkinson's too. So, like, you know, there are all these things. And I mean I think just from the smaller body physicality, maybe there are some divisive

considerations that go into that healing and things like that. And Dr. Won can comment. But you know, mostly I just treat everyone, you know, as much as I can as an individual.

Doris Wang:

I agree. Yeah, I don't, you know, see any major differences except for maybe the older women tend to have, you know, thinner scalp skin, so you know, just smaller profile devices. I would like guess if they can tolerate rechargeable, I probably would urge them towards that. Again, it's agnostic to moon or woman, just anybody within skin and thin frame.

Melani Dizon:

Yeah. So, for people, for both of you, for people who are watching this, what do you think is important for them to know about DBS?

Doris Wang:

I think that for the well-selected patients, and you know, once you understand what the device can do and cannot do for you it can be a really great life-changing therapy. And so, I think you just need to find out more information about it from your neurologist and then go to an experience center to be evaluated. Those are my 2 cents. Yeah.

Jill Ostrem:

Yeah. I mean, I agree. I think, you know, we've come a long way. It's a very powerful therapy. And you can still manage, you know, a lot of the other symptoms with medication as well, you know, using in combination. And most people I think that we see that we have implanted have not regretted having surgery. Almost everyone wishes they had done it earlier. Yeah. But, you know, you can't talk anyone into it, and they have to be ready and sometimes they have to notice, have enough disability to get over the hump. But I just really encourage people to find the right team that they feel comfortable working with. Because you're going to be, you know, followed now, you know, after we're managing the device for the rest of your life and so you just want to make sure you've got a good team you're also working with. But you know, it's amazing. We still don't fully understand how this works, right? How it helps, but it is, you know, probably besides levodopa the greatest advance we've ever had in the field of Parkinson's therapy. So, you know, it keeps getting better.

Melani Dizon:

Yeah. I just thought of a question because I know this happened. Well, anecdotally, this happened to somebody, so they actually got implanted and they got an infection right away, and so they took it out, but he experienced that ablation, like the benefits of that. Can you talk a little bit about what that is, Dr. Wang, and why that happens?

Doris Wang:

Yeah, so with any DB implantation, we can get a microlesion effect, right? Just by putting an electro penetrating your brain and that effect, you know, from swelling or whatnot doesn't last usually too, just a few weeks. So, people can effectively experience this kind of honeymoon period even before we turn on stimulation. And yeah. And somebody who gets an infection, if it's, you know, around maybe even the brain lead, they can kind of have a longer prolonged microlesion effect, for instance. Right. So, so even removing the act of removing electrodes also, you know, stirs up edema. So yeah, it doesn't surprise me that just means electrode is probably pretty well placed in the first place.

Melani Dizon:

Yeah. He was like, this was great. I was supposed to only be for a couple of months, and it ended up being for a couple of years, so something went, and then he ended up getting implanted again, so.

Doris Wang:

Right, right. Usually, we recommend reimplantation, you know?

Melani Dizon:

Yeah. Well, I really appreciate you taking the time to talk to me today about this and our community. I have so many questions about DBS and am just grateful to share a lot of information from both sides of the operating room.

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