

Michael J. Fox:	00:06	This is Michael J. Fox. Thanks for listening to this podcast. Learn more about the Michael J. Fox Foundation's work and how you can help speed a cure at MichaelJFox.org .
Speaker 1:	00:15	You're listening to audio from one of our third Thursday webinars on Parkinson's research. In these webinars expert panelists and people with Parkinson's discuss aspects of the disease and the foundation's work to speed medical breakthroughs. Learn more about the third Thursday webinars at MichaelJFox.org/webinars . Thanks for listening.
Rachel Dolhun:	00:37	<p>Thank you everyone for joining us. I'm Rachel Dolhun, vice president of medical communications at the Michael J. Fox Foundation for Parkinson's Research and I'm your moderator today.</p> <p>Today we're going to be discussing dystonia, which is a movement disorder on its own and a Parkinson's symptom that can cause painful muscle cramping.</p> <p>So let's meet our panelists. Brian Reedy is a retired teacher from Carson City, Nevada. He was diagnosed with Parkinson's at age 51. Welcome Brian.</p>
Brian Reedy:	01:06	Thank you.
Rachel Dolhun:	01:07	Doctor Erin Furr-Stimming is an associate professor of neurology at the University of Texas. Hi Doctor Furr-Stimming.
Erin Furr-Stimming:	01:14	Hi, thanks for having me.
Rachel Dolhun:	01:16	And Doctor Christine Kim is an instructor of neurology at Yale School of Medicine. Thanks for joining us Doctor Kim.
Christine Kim:	01:22	Hi, thanks so much for having me.
Rachel Dolhun:	01:24	<p>So we've got a lot to get to so we're going to jump right into it. So let's see what we're going to talk about today. We're going to first start by defining dystonia. We're going to talk about what causes dystonia and the current ways we can treat it. And then we're going to end by talking about ongoing research. What we can do to learn more about dystonia and how we can improve treatments for it.</p> <p>And through out the hour we'll try to pepper in your questions so keep sending those to us and we'll also spend some time at the end getting to more of your questions.</p>

So let's start as I said by trying to define dystonia. So Doctor Kim I'd like to start with you. Can you give us sort of a basic definition of what dystonia is?

Christine Kim: 02:06 Yeah, sure. So dystonia as you mentioned it can happen both in the setting of Parkinson's disease and kind of on its own. In both of those settings, dystonia we really define by kind of what it looks like and what the patient experiences in their body. What they experience is prolonged muscle contractions. That can be cramping, it can be uncomfortable. It can also result in abnormal movements, sometimes even shaking of the body part that's effected and kind of strange positions of that body part that the person has difficulty controlling.

Rachel Dolhun: 02:44 And doctor Furr-Stimming I'll turn to you now. And I want to go a little bit into more of what dystonia can look like and be and the presentations of it and the different postures and positions because I think a lot of times people don't recognize that they're experiencing dystonia. So it can be confusing of if and what dystonia is, but talk a little bit more to us about how dystonia can be a movement disorder by itself but it also can be part of Parkinson's, I think that can be confusing.

Erin Furr-Stimming: 03:15 You're exactly right, Rachel. So dystonia is as Doctor Kim mentioned, it's often described as sustained muscle contractions, often pulling, twisting, turning. But dystonia, and while dystonia can be a part of Parkinson's Disease it can occur on its own. And so actually in 2013 the classification scheme was revised a bit to help us define and describe dystonia and ultimately decide upon an ideal treatment. So it's now divided into two axes.

Axis one, is really defined as a clinical characteristics of dystonia. Which means what age is the patient when they start experiencing dystonia. What distribution, body distribution, so what part of the body is effected. So just to go into a little bit more detail about that. There are many different parts of the body that can be effected with dystonia. For example, the eyes can be effected, patients can have involuntary eyelid closure which is called Blepharospasm, that's a form of dystonia. Another focal dystonia, one part of the body being involved would be the neck. So cervical dystonia, or sometimes called spasmodic torticollis, involuntary head and neck turning or pulling. So focal dystonias are really just one part of the body that are effected.

If we have multiple parts of the body, so one limb and maybe the trunk then it's a segmental dystonia. So we define the

dystonia based on the location that it occurs throughout the body.

And we also describe dystonia based on its temporal course. Has it ... does it come and go? Has it been present for many years? Has it started acutely?

The second axis that we use for the clinical classification scheme is etiology, or the cause of dystonia. We know that dystonia can be part of Parkinson's and related to other neurodegenerative disease, but it can also be inherited or acquired. So we have to try to do our best to figure out the cause of the dystonia. Again, so that we can effectively treat the dystonia.

- Rachel Dolhun: 05:17 That's really helpful. And so Doctor Kim, I want to turn back to you now. And tell us a little bit more, we're getting a lot of questions about [inaudible 00:05:26], what can dystonia look like, especially in Parkinson's and does everybody with Parkinson's get dystonia?
- Christine Kim: 05:33 So, not every patient with Parkinson's Disease develops dystonia, but it is quite common in Parkinson's Disease. One of the interesting things and kind of challenges with dystonia in Parkinson's disease is that dystonia can happen both due to the Parkinson's Disease itself and also related to the medications. So that's kind of a challenge in managing the dystonia that happens in Parkinson's disease specifically, is trying to tease out whether there's a relationship to the medications, what that relationship is, because that can help to guide the management of the dystonia symptoms and to treat those symptoms the most effectively.
- Parkinson's Disease, as Doctor Furr-Stimming had mentioned, the dystonia of Parkinson's Disease can effect various parts of the body. Commonly we see it effecting the eyelids, as she had mentioned. We can also see it in the face, the muscles of the face, I think ... I'm not sure if everybody has access to the slides but we see in Brain some dystonia effecting his face, which he can perhaps tell us a little bit more about.
- We also can see it effecting the limbs, particularly the feet. Often patients will notice that they'll have curling of their toes involuntarily. That can be quite uncomfortable, and is a common form of dystonia that we see in Parkinson's disease.
- Rachel Dolhun: 07:09 So just to kind of recap, probably the more common in people with Parkinson's is in the legs, in the toes curling under, the foot

turning in, or the calves cramping and those sorts of things. And although it's common in Parkinson's not every single person with Parkinson's will get dystonia.

Christine Kim: 07:27 Yes, that's right.

Rachel Dolhun: 07:29 Okay.

Christine Kim: 07:29 Fortunately, many people are spared that.

Rachel Dolhun: 07:31 Great.

And Brian I want to bring you into the conversation now a little bit. We see on the screen there that it can be more common in people with young or younger onset Parkinson's, which we defined as somewhere around being diagnosed at the age of 40 or 50, and although you were kind of right on the cusp of that, you have dystonia. So tell us a little bit about your dystonia in Parkinson's.

Brian Reedy: 07:55 So mainly I've had the dystonia in my feet for a few years. And we saw a foot doctor and he thought it was something else and we didn't really get it recognized as dystonia until about a year ago. And then the face tugging thing, I just thought that was masking or my face when I'm more exhausted or having more problems. So it took a while for me to understand all of this was dystonia. And it's definitely the feet are the biggest challenge. So.

Rachel Dolhun: 08:34 Tell us a little bit more about how it effects your feet. Do they turn in? Does it effect your walking? Is it painful? Maybe help our audience understand a little bit more about how the dystonia effects you.

Brian Reedy: 08:45 Sure. So on my feet my toes curl in, and it's mostly my three smaller toes. So my big toe and the index toe kind of aren't curled as much, but the other three toes curl a lot. And the thing that I do mostly for that is ... they're very hard to move and sometimes I feel like they're paralyzed. But my physical therapist has me put a towel on the ground or a napkin and then try to curl it with my toes, and stuff like that helps me get some movement back. But it makes walking difficult.

Recently I was training to do a bike ride across California, and as I started to do more intense bike riding the cramping became far more severe. And I found that I did too much too fast. So I'm trying to figure that out and work it more slowly.

Rachel Dolhun: 09:48 So it certainly can effect other things. Your walking as you said, your ability to exercise. Your quality of life. And we'll get a little bit more into the treatment, but thanks for sharing your experience. And I think a lot of other people have very similar experiences as we talked about.

I'd like to move into some of the causes of dystonia, which isn't a simple question to answer. But often times Doctor Furr-Stimming we get this question, what causes dystonia. And not an easy answer but can you help us try to figure that out a little bit?

Erin Furr-Stimming: 10:19 Absolutely. You're right, it is not an easy answer or a short answer, but I will try to be more specific to Parkinson's Disease. In general we don't fully understand the cause of dystonia. We think that in relation to Parkinson's and other causes of dystonia we have implicated the basal ganglia, so the structures deep within the brain that are important for movement, coordination or movement, fluidity of movement, and in contributing to dystonia. And there are different ... there's wonderful research that's occurred and still underway and better kind of understanding the cause from a neurochemical and different pathways from that perspective. Sort of behind the scenes.

But we think there might be an issue with what we call sensory motor integration and difficulty with the brain sort of receiving repeated, these repeated movements and ultimately translating into dystonia.

But more specifically with Parkinson's Disease, and we can talk a little bit more about this when we come to treatment. There is often in patients that have been on levodopa therapy, there is often a relation to levodopa therapy in causing the dystonia. Either too much or too little levodopa. And so that we may want to focus a little bit more on of the details of that when we talk more about treatment. But we think that there is a contribution to the fluctuations in the levodopa levels and the dystonia occurring in many patients with Parkinson's Disease.

Rachel Dolhun: 12:03 So it's kind of this complicated mix of something in the circuitry in that basal ganglia and then potentially something with the medication as well?

Erin Furr-Stimming: 12:12 Exactly, exactly. And we really are ... we're able to better sort of define in our patients with Parkinson's when the dystonia occurs from the wonderful information that our patients give us when they come and visit with us in the clinic. And they're often able to articulate when the dystonia is most bothersome in

relation to their medications which help us guide our treatment strategies.

Rachel Dolhun: 12:40 So, Doctor Kim maybe we can delve into that a little bit further because that's the last bullet point on this screen. It says in Parkinson's dystonia can happen both when your levodopa is wearing off when you're kind of getting to the end of a dose and your next dose of medication is scheduled. But also when your medication is working well. So that can be really tough to figure out and tough to understand. Tell us a little bit more about that.

Christine Kim: 13:06 Yeah, absolutely it is tough to understand and certainly even among neurologists. We don't even quite understand the circuitry that drives that difference. But that is a phenomenon that we see very strongly in Parkinson's Disease. And as Doctor Furr-Stimming was mentioning, really our patients themselves are in so many other ways the best resource in kind of teasing this out. Patients will often keep to a relatively regular schedule of their levodopa medication. And we encourage them as with other symptoms of Parkinson's to keep a diary and to kind of keep track of when they experience the dystonia together with their other symptoms. And by doing that we're able to sometimes tease out a bit of a pattern in when the dystonia happens.

When we see it working ... when we see it happening as kind of an effect of the medication at it's peak that tends to happen pretty shortly after they take the medication, that makes sense. They might notice other symptoms improving with kicking in and other evidence that the medication is working well, that might be 30 minutes after they take that medication. And that kind of dystonia tends to be relatively short lived and then kind of taper off as the medication levels drop in the blood stream.

The other kind of dystonia that we see when the medication is wearing off. We sometimes can put that together in that it's a bit delayed after the medication's taken. And the person might start to experience other symptoms of wearing off. They might start to notice that they're stiff or slow, or that they have tremors coming back at that same time, and might notice dystonia happening at that time.

So if we're able to establish a pattern like that then that's very helpful in coming up with a good plan and managing the dystonia. So as it might seem logical if the dystonia is happening as a result of the medication wearing off, the management is similar to other problems with wearing off. We might consider giving the medication a little bit more

frequently. Or giving a longer acting formulation of the medication. And if it's happening as a result of a kind of a peak effect of the medication we might do the opposite. So consider a slower releasing form of levodopa for example. Things like that.

So we really try to tailor the management of the dystonia to what's happening to that particular patient.

Rachel Dolhun: 15:56 So it's a pretty complicated thing. And we'll get into a little bit more of the treatments on the next slide. But Brian I want to bring you in again, because I think you talked a little bit about how levodopa maybe didn't necessarily have an effect on your dystonia and how you kind of tracked it and tried to figure it out. So tell us a little bit more about your experience with that.

Brian Reedy: 16:18 Yeah, recently when I was at a doctor's appointment my movement disorder specialist, I was just needing to take my medication, I was at the end of the first dose and I was very symptomatic with the dystonia in my face and in my feet. And then we had to wait an hour for somebody else to come in so we went walking around. I took my medication, at the beginning of that hour, came back in and I was still as bad as I was and that was interesting because sometimes I feel at least my face is effected by the medication. That when I'm off my face tends to pull more or when I'm ... towards the end of the day I'm more exhausted. But I've not yet been able to really figure out. It seems like the feet are in a dystonia way more often than not. So I have yet to figure out if it's medication effected or not, but it seems like the face at least is towards the end of a dose.

Rachel Dolhun: 17:27 And Doctor Furr-Stimming does that happen in some people, where they just can't see a relation to their levodopa medication, they just have dystonia and Parkinson's?

Erin Furr-Stimming: 17:36 Unfortunately yes. And I say unfortunately because it makes it more difficult for us to come up with a treatment. It's certainly still possible to come up with a treatment, we just have to get a little bit more creative. And when it is ... when we can implicate the dystonia in relation to the levodopa levels, then as Doctor Kim nicely described, we can modify the dosing intervals or the does itself. We have ways that we can try to minimize the symptoms. But if it doesn't really seem to be correlated with the levodopa. Then we have to come up with different treatment strategies.

The good news is there are other treatment strategies so we can start to use those.

Rachel Dolhun: 18:19 Great. And since we're on the topic of medications. We've got a question, are there other medications that cause dystonia. Doctor Kim, can you answer that one?

Christine Kim: 18:29 Sometimes we can see dystonia happening with medications other than levodopa. Among our Parkinson's patients levodopa is the most common culprit I would say. But other medications in that dopamine pathway, so the dopamine agonist for example sometimes can cause a bit of dystonia. Levodopa I would say is the most common though.

Erin Furr-Stimming: 18:54 And I'll just add to that there are medications that our Parkinson's patients usually are not taking but they could be that are sort of blocking the dopamine receptors and those sorts of medications, or even rarely some of the antidepressants and some other medications, can contribute to dystonia even some of the antiemetics or medications used for nausea can cause dystonia. So it is a great point in that we need to always look at the medication list and make sure there's nothing that we are doing as physicians in treating our patients and contributing to the dystonia.

Rachel Dolhun: 19:29 And just going to keep going with a couple questions here because so many good ones are coming in. We're getting questions about how does dystonia evolve. Does it always get worse? Does it always change body parts? Brian mentioned that it started in his feet and now he's got it in his face. Doctor Furr-Stimming?

Erin Furr-Stimming: 19:48 Well, it does ... it can evolve over time. If it occurs in one limb for example, as Doctor Kim mentioned earlier, it may occur say in the foot, there may be some curling of the toes or inversion of the foot. That's not terribly uncommon in early morning hours when the Levodopa levels may have worn off. If it occurs in the foot, it doesn't necessarily mean that down the road it will occur in the upper extremity or in the face. So it's not a given that it will spread.

In other types of dystonia and what we call generalized dystonias that are inherited, it will continue to ... often it will start in one limb, and it will continue to evolve and spread throughout the body and affect other limbs and the trunk. But in Parkinson's, that's not a given. It may be restricted to one limb or it may be both feet, but it does not absolutely evolve over time.

Rachel Dolhun: 20:44 It doesn't always necessarily get worse or change body positions.

Erin Furr-Stimming: 20:48 Exactly. It doesn't always change body positions. And it can get worse over time if it's not treated, or we might find that, for example, if we are injecting the patient with botulinum toxin, which we'll talk about, that the dystonia is better while the medicine is actually working but then worsens at the end of the treatment effect. So it may fluctuate in its severity.

Rachel Dolhun: 21:11 And two more questions, one specific to Parkinson's, Doctor Kim. A lot of people asking about stomach cramping and pain in Parkinson's, is that dystonia?

Christine Kim: 21:22 People can have effects on the abdominal muscles themselves. Sometimes, patients can have a bending forward of the posture because of a true dystonia affecting the actual abdominal wall muscles. The kind of stomach discomfort itself wouldn't be a classic true dystonia, but that can be a similar symptoms in that it could be a symptom of Parkinson's disease that is affected by the Levodopa and might fluctuate together with the Levodopa.

Rachel Dolhun: 22:04 It also could probably be hard to figure these things out a lot of times, right? There are a lot of other stomach and digestive issues that can happen in Parkinson's, right? Constipation or slowed stomach emptying, feeling full, or those sorts of things. And so probably it's hard to sometimes parse out what's what. And so maybe keeping a log or determining if Levodopa helps your symptoms if you have cramping, those sorts of things, would those be helpful?

Christine Kim: 22:30 Yes, absolutely. That would be helpful. And also, the Levodopa itself of course can have side effect affecting the stomach, with nausea being a very common one. So yeah, as with all things, it can be a bit complicated, but keeping kind of careful track of the symptoms and their timing can be very helpful in coming up with a good solution for them.

Rachel Dolhun: 22:53 Great. And then last one before we move on. Doctor Furr-Stimming, how do you know if dystonia is dystonia the movement disorder or if it's Parkinson's? Somebody wrote in they have cervical dystonia. How do they know if they're going to stay with cervical dystonia or they have Parkinson's and this is just the beginning of their Parkinson's?

Erin Furr-Stimming: 23:15 Good question. So usually, as was mentioned earlier, if dystonia occurs in patients with Parkinson's and unrelated to, say, the Levodopa levels or in folks that have lived with Parkinson's for a while, it's likely part of their Parkinson's disease and they're motor manifestations of Parkinson's disease. There are patients with young onset dystonia as you mentioned ... excuse me,

young onset Parkinson's, as you mentioned, in which they may be symptomatic in their 40s. And these folks may have dystonia early on. Often when they have dystonia early on, prior to receiving a diagnosis of Parkinson's, it's in the limbs. So most often it's in the foot and they have something called kinesigenic dystonia, which is a fancy term for dystonia or cramping of their foot and their toes when running, when moving. And so these individuals may have foot dystonia or cramping and are subsequently diagnosed with Parkinson's.

It is within the realm of possibility, I suppose, that someone with another type of focal dystonia like a cervical dystonia, neck pulling, twisting, turning, could be diagnosed with Parkinson's disease, but it's less likely. So if a patient, like I said, already has a diagnosis of Parkinson's disease and they've lived with Parkinson's disease for a few years or so and then they developed dystonia, it's likely all related. But if someone has a focal dystonia, say a cervical dystonia where the neck and the head is involved, then they may just have isolated cervical dystonia. And assuming they don't have any other neurologic changes on their exam, they may only have cervical dystonia and it may be unrelated to any possibility of developing Parkinson's disease.

- Rachel Dolhun: 25:07 So a tough question to answer, but keep close followup with your doctor watching for other signs and symptoms of Parkinson's is probably the best thing to do.
- Erin Furr-Stimming: 25:16 Yes, exactly. And right. The diagnosis, as you know, of Parkinson's disease in general is really a clinical diagnosis, so it's based on the neurologic exam, the findings that when we ask patients to do finger tapping and walking and assess their tones, it's really based on the neurologic exam and the history, the information that we get from our patients when we ask them lots of questions.
- Rachel Dolhun: 25:40 Great. So let's move on. We've already talked a little bit about treatments for dystonia, but let's delve into those a little bit more. And Doctor Kim, I'll start with you because you talked a little bit about the medications. But tell us a little bit more about the treatment for dystonia. And maybe we start with medications or there are other things that we incorporate. How do we treat dystonia?
- Christine Kim: 26:04 Yeah, sure. That's a great question, and there are many great treatments available. And one thing that I'll mention kind of right from the get go, as with many things in Parkinson's disease, it takes sometimes a little bit of trial and error with the

available agents to kind of find the best solution for each patient. But that's quite normal and sort of par for the course. It's something that of course can be a little frustrating for people when there's a bit of a delay in coming up with a final plan, but often it takes a little bit of tailoring to get things individualized for each patient.

So with that being said, as I had mentioned, really the mainstay of dystonia management, medical management in Parkinson's patients does tend to be this kind of modification or adjustment of the Levodopa regimen if we're able to tease out a good pattern of the symptoms relative to the Levodopa. So those are the things that I had mentioned in the case of these more peak dose dystonias, things like dose reduction, switching to a slower acting formulation of the Levodopa, or even taking the medication with perhaps some food in the belly to slow down the absorption. These are small tricks that can slow down the peak dose of the Levodopa in the bloodstream and the improve the symptoms of the dystonia in that way.

And then with the more off kind of dystonia being managed with increased dose frequency or consideration of longer acting formulations of the Levodopa. And often, we can achieve pretty good improvement in the dystonia symptoms by just adjusting the Levodopa medication and the schedule of that to improve quality of life quite a bit.

There are, though, other medications, oral medications, that are available for the treatment of dystonia. And as with all medications, we need to be a little bit careful as far as the side effects that these might cause. So we do try to be cautious and start with low doses of these medications and kind of monitor closely as we go along. So I'll mention both the benefits of these medications and some of their possible side effects as we go along.

But first class and really kind of a very tried and true class of medications for the treatment of dystonia are anticholinergic medications, and these include things like trihexyphenidyl, with a trade name Artane, which can be very effective in treating especially dystonia that's affecting multiple body parts, more of generalized dystonias. This class of medications can have some side effects like drowsiness, a little bit of trouble with concentration, and also things like dry mouth. So we do monitor for the side effects and consider things like dose reduction if people develop them. Sometimes, the older that a person gets, the more sensitive that they might be to these kinds of side effects. So we keep a close eye out for them.

Another class of medications are the benzodiazepine medications, including the medication clonazepam. And that medication has a kind of dampening effect on the activity in the nervous system in general and can be very effective in treating the symptoms of dystonia and then, again, especially in the case of somebody has a dystonia that's affecting multiple body parts, more of a generalized dystonia picture. And then with this medication, we again keep an eye out for causing drowsiness or trouble with concentration and tailor that regimen if we need to. Again, that's a medication that, as we get a little bit older, might be a little bit more difficult to tolerate in terms of that drowsiness. So we just monitor closely for that.

And then the final class of medications that we use are muscle relaxants, like the medication Baclofen or Flexeril. And again, sometimes we can see a little bit of drowsiness with that medication. But all of these agents can be effective in and of themselves in treating dystonia and also normally in combination. So it might take one or more of these agents in a tailored regimen for the patient to get a good balance in symptom control and side effects.

Doctor Furr-Stimming I think had mentioned as well the possibility of Botulinum toxin, which is a real mainstay of treatment in the treatment of dystonia. And Botulinum toxin is an injectable form of medication. It's actually a toxin that's formed naturally by a type of bacteria. But fortunately for neurologists and for patients, it has an effect in slowing down the communication between muscles and nerves, so decreasing the activity of the muscles that are overactive in dystonia.

And that kind of treatment can be very helpful, especially when there's one particular body part that's affected by the dystonia. So for example, Brian had mentioned that his toes tend to curl under, especially at the end of his doses. And we're sometimes able to achieve a very good relief in that by injecting just those specific muscles that are affected by that very focal dystonia.

Rachel Dolhun:

32:24

So if somebody, for example, had like you said one specific muscle, maybe their arm or their toes, that are affected, you might inject Botox and you would have to do that every maybe three months or four months because the effect wears off, right? And then you would also potentially be adjusting medication or giving them a medication on top of that depending on what their dystonia was like and what their specific treatment regimen was like and maybe also what other medical problems they have, what other medications they're on, what other symptoms they have with their Parkinson's.

Christine Kim: 32:59 Yes, that's exactly right. Everything would be really tailored to, exactly, the other medications that the person takes and other medical problems that they might have. I'll mention that sometimes with Botox injections alone, we're actually able to achieve enough symptom relief that the person doesn't need additional oral medications. So that's one great benefit of the Botox injections for the right patient, that we're able to achieve relief in their symptoms without causing systemic side effects so side effects affecting concentration or other body systems. So for the right patient, they can be very effective. But as you said, yes, in combination with adjustments of other medications.

Rachel Dolhun: 33:50 And thank you so much for that comprehensive discussion of the medications and the Botox. Brian, I want to talk to you a little bit about the therapies because you mentioned physical therapy for your toe curling under. And we can also use occupational therapy or even speech therapy when we have facial dystonia. Tell us a little bit more about how the exercises that you've done and how that's worked for you.

Brian Reedy: 34:16 Sure. And I've done the medications too. I've had Botox injections in the feet, and they've helped a little bit. But I tend to lean more towards what I can do myself in the lifestyle change 'cause we have so many medications on us. So the physical therapy that I mentioned before with the towel or a napkin on the floor and curling it with the toe. With my face, they recommended speech therapy or just doing "oh" and "ah" and moving it more and stretching it and doing that when I'm exercising anyway, even if I'm not having the dystonia at that time, just to keep it more loose or limber.

And then I also do, aside from my walking which isn't as much because of the dystonia, but the bike riding. And then I do swim therapy, pool therapy, and I find that to be really beneficial because I can stretch the feet better in the water, and just even the resistance of trying to kick and trying to work the muscles more than I would if I were just on land seems beneficial.

So it's really a consistency of doing a lot of these various therapies, and they all definitely have gains. It's just keeping it consistent and working at it that makes it long-term beneficial.

Rachel Dolhun: 35:52 So Doctor Furr-Stimming, physical therapists, they not only can give you specific exercises that are tailored to help with the muscles that are involved in dystonia, but they also can help you tailor a regular exercise regimen that might help with dystonia. Are there other exercises that you know of that might be helpful for dystonia, our audience is asking?

- Erin Furr-Stimming: 36:13 Well, I think as Brian nicely described, it's really about finding an exercise regimen that works for you and your lifestyle. I think spending time in the pool is a fantastic idea. You're not fighting gravity, and you can really stretch and move with confidence and often without pain. And I would definitely agree that working with our physical and occupational therapists is a fantastic way to identify different types of stretches that are safe and that will hopefully be helpful in minimizing the discomfort that's often part of dystonia.
- Rachel Dolhun: 36:54 And continuing on the kind of non-medication strategies, we see on there complementary therapies, acupuncture and massage. Can you tell us anything about acupuncture for dystonia?
- Erin Furr-Stimming: 37:05 So acupuncture has been studied a bit in dystonia and in other neurologic conditions. We don't have quite as much evidence-based medicine as we would like in the realm of acupuncture and specifically dystonia related to Parkinson's disease, but in general there are reports of acupuncture helping with especially the pain related to dystonia. Not everyone with dystonia has pain, but often pain is a common aspect of dystonia. And in working with my patients, if they found someone that can provide acupuncture and they're happy with that individual, then I think it's reasonable to give it a try. Often, we'll use acupuncture in conjuncture with more kind of traditional pharmacologic therapies.
- And the same is true for massage therapy. It really ... because we all know Parkinson's disease is multifaceted, that patients have motor and non-motor symptoms. The treatment is the same. We use medications. We have effective medications, which is why we love treating Parkinson's disease. But we often need to also rely heavily on non-pharmacologic options and really kind of think outside the box. And as long as we feel confident that the therapy, non-pharmacologic therapy is not going to be harmful, I think it's absolutely ... and that's including to your bank account. So as long as it's not too costly, then I think it's worth exploring and figuring out a regimen that works to minimize the discomfort and to optimize quality of life.
- Rachel Dolhun: 38:39 Just one last question along those lines. And maybe, Brian, you were going to add on this. What about could people do anything with diet or hydration or electrolytes? Sometimes you hear about magnesium, or I even had people who would eat tablespoons of mustard to help with their dystonia.

Doctor Furr-Stimming or Brian, anything that you have to add on that?

Brian Reedy: 38:59 I was just going to mention something about massage therapy. So if you want to go with this line first, and then I could come back 'cause I'm not sure about nutrition outside of I definitely know that I need to keep more hydrated and that helps.

Erin Furr-Stimming: 39:13 Yeah, exactly. And I'll let you talk about your experience with massage. I couldn't agree more. We are always reminding our patients to stay hydrated, especially here in Houston where it's far too warm. But hydration is really key because if folks are dehydrated they're at risk not only for potentially worsening of their dystonia but also potentially a drop in their blood pressure upon standing or orthostatic hypotension. So it is very important to stay hydrated.

Some folks anecdotally have found that things like magnesium will help a bit. Sometimes it really doesn't make an impact and we have to get back to Levodopa and the relation to Levodopa. But I absolutely agree that staying hydrated is extremely important.

Rachel Dolhun: 39:59 And then Brian, if you want to tell us about your experience, your personal experience with massage, that would be lovely.

Brian Reedy: 40:04 Yes. I purchased a foot massage thing. I don't recall the brand name of it or anything, but it's basically where you have socks on and you insert your feet in there. It does through roller massage and pressure work the feet pretty well. And you can change the levels. And at first I just thought, "Ah, that's not doing well."

And then when I put it on the high mode, and I found it doing pressure and squeezing the toes and then releasing them, and doing the same with the ankles, and then rolling the bottom of the feet, it was absolutely wonderful, because I got more circulation in my feet than I'd felt in a long time. And I think there's a great benefit to that. And I'm not one much to have somebody go give me a massage. That's not kind of my nature. So this thing was perfect. And so I'm excited to see what this does as we go down the line with it, but I wanted to share that, because I did definitely see some benefit from it.

Rachel Dolhun: 40:59 That's great. And again, it's all about finding what works for you.

And lastly, Dr. Kim, I'd like to turn back to you to tell us a little bit about deep brain stimulation. This is a surgical therapy that's used in people with dystonia, the movement disorder, and people with dystonia and Parkinson's disease. Tell us a little bit about it, and as you do, we've also gotten a question about what's the target in dystonia versus Parkinson's where you put in the brain? So do address that in your answer please.

Christine Kim:

41:29

Yeah, absolutely. So deep brain stimulation, as you are well aware, has really changed the treatment of Parkinson's disease and dystonia dramatically. As you mentioned, it is still a surgery. But first thing to mention I think is just that it's not, really not for everyone. But for the right patient who is a good surgical candidate and whose symptoms stand a very good chance of improving with the surgery, it can have a very good effect on dystonia as with other symptoms of Parkinson's disease.

And as you mentioned, it is also, has been used for primary forms of dystonia as well. And I'm glad that our astute audience member had asked about the target that's used in dystonia, 'cause it is a crucial question about this procedure in general. The target that's used for dystonia is the globus pallidus, which is used as well for other symptoms of Parkinson's disease. There has been work done looking at other targets, traditional targets of deep brain stimulation in dystonia, including the subthalamic nucleus. But currently, the strongest evidence is for the most improvement with the globus pallidus. But I would say that that question is still under investigation.

One thing I'll mention with the deep brain stimulation is that for the symptom of dystonia, it's a little bit different than with some of the other symptoms of Parkinson's disease or even other symptoms that are treated with DBS in that there is classically a bit of a lag in improvement in the dystonia symptoms following the procedure and following changes in programming. And that can actually be up to two or three months.

So patients won't see necessarily a dramatic improvement in their symptoms immediately after the surgery or immediately after they leave the office, but it's a more gradual process, which gives us some clues as to what the driving factor for the improvement is. So probably there are some changes in the connectivity in the brain circuits that are happening as a result of the surgery that are allowing that person to gradually improve over time.

- Erin Furr-Stimming: 43:59 I would also just like to add if you don't mind to deep brain stimulation, I absolutely agree with everything that Dr. Kim mentioned. DBS is an effective symptomatic therapy that was approved back in 1997 by the FDA for the treatment of Parkinson's disease. It is a very effective therapy and essentially does what levodopa does for you.
- But I would like to mention, as is mentioned in the slide, that DBS is not necessarily for everything. So the best predictor of a favorable outcome from DBS is appropriate patient selection. And so as movement disorder docs we want to ensure that our patients have a robust and sustained response to levodopa and that their motor scores improve on something called the Unified Parkinson's Disease Rating Scale by at least 30 percent.
- We also want to make sure that cognitively our patients are in good shape. So we'll ask our patients to pursue neurocognitive testing to ensure that they are strong, cognitive candidates. But if a patient has dystonia and they have Parkinson's, and they appear to be good candidates, then I absolutely agree with Dr. Kim that it can be a very effective therapy.
- Rachel Dolhun: 45:06 One of the places where we're working toward new and improved therapies, we're trying to improve upon DBS for dystonia and Parkinson's, and if we move to the last slide, we see where research is working to not only improve surgical options, but also medication options, improve our levodopa delivery, but also new drugs for new targets. And also a better understanding of what's going on with that brain circuitry in the basal ganglia that overlaps with dystonia and Parkinson's. So a lot of research into better understanding, then better treatments.
- But I'd like to spend a little bit more time just getting to the questions, because there are so many that are coming in. So if we can just move to more questions here. Dr. Furr-Stimming, we talked a lot about a couple different types of dystonia. We talked about the eyelid closure, about cervical dystonia. We're getting questions about specifically are those treated?
- Erin Furr-Stimming: 46:04 So, great question. So mostly when we're dealing with a focal dystonia, and that would be essentially one region of the body, so the neck, or the eyes, or the hand, arm, or maybe the foot, then really the first line treatment would be botulinum toxin as Dr. Kim mentioned earlier. We want to ... And in conjunction with likely non-pharmacologic therapies as well, the physical therapy, occupational therapy and those sorts of options. But really for focal dystonias, assuming that there is no obvious

correlation with levodopa and modulating the levodopa levels, botulinum toxin injections are really the treatment of choice.

As Dr. Kim mentioned, the nice thing about botulinum toxin injections is really there are very little systemic side effects. Most of the side effects are related to the location that we inject. The mechanism of action of botulinum toxin is to essentially weaken overactive muscles and so if ... and when we start injecting, as Dr. Kim mentioned, we'll often ... it's a process. We may inject a lower dose to start for the initial round of injections, and see how patients do. And then over time, we may modify the location of the injections or the dose to optimize the patient's response.

So for again a focal dystonia, probably botulinum toxin is the first choice. And for a more generalized type of dystonia, or if we have various parts of the body affected, then we need to get more creative with the oral medications. And again, with non-pharmacologic strategies as well.

Rachel Dolhun: 47:39

And, Dr. Kim, lots of questions about what are the potential risks of Botox?

Christine Kim: 47:44

Yeah, that's a great question and one that patients often come in to the clinic with. As Dr. Furr-Stimming had mentioned, it works really by weakening the muscle that's injected. So one of the most common side effects with the injection can be that the person experiences some weakness in that limb, which might affect their ability to use that body part. So we try to shoot for kind of the perfect dose at which the patient has relief in the dystonia without experiencing enough weakness that they're affected in their everyday life. Sometimes that takes a little bit of trial and error to identify what that dose is. And there can actually be a little bit of variability between people on what exactly is the best dose.

Other risks of the Botox injections are similar to other injections in the body. Anytime there's a puncture to the skin, there's a risk of having bruising at that site. So in an arm or a leg that's often not a concern. Sometimes we will do injections in the face, such as the eyelids, for blepharospasm. And then that can be a little bit more bothersome cosmetically. And anytime there's a puncture to the skin as well, there can be a risk for having infection. However, the procedure is done sterile with sterilized equipment and sterilized medication, so that risk tends to be quite low.

I'll mention as well that the nice thing about the Botox is that the effects do wear off within about three months. So that means that the injection does have to be repeated every three months as you had mentioned, but also that if we do have a problem with maybe a little more weakness than we had been shooting for, then that weakness will wear off over time and then with the next dose we can adjust for that.

Rachel Dolhun: 49:43 And Dr. Furr-Stimming, a practical question. Does insurance or Medicare pay for Botox?

Erin Furr-Stimming: 49:49 That is a very important question because Botox or botulinum toxin, Botox is not the only botulinum toxin that we use, but is very expensive. So we definitely want to ask that question. And the good news is, it is usually covered, but I say usually because never say never, by Medicare and most commercial insurance plans. But we actually have a full time employee here that solely works on botulinum toxin and ensuring that it's approved. It is usually ... must approved through a specialty pharmacy, at least in our clinic, and then the specialty pharmacy mails the Botox to our clinic or the botulinum toxin, like I said, there are different brand names. And then there's usually a fee for the actual procedure. So for the physician that's injecting the botulinum toxin, we bill for that service as well. But more often than not, we are able to get the botulinum toxin covered at least the majority of the cost, which makes us happy and our patients happy.

Rachel Dolhun: 50:54 Great. And Dr. Kim, a question from [inaudible 00:50:58]. What might trigger dystonia or make it worse? So things like anxiety or stress or fatigue. Do those things bring on dystonia or exacerbate the symptoms?

Christine Kim: 51:10 Yeah, absolutely. That's a great question. Absolutely, the case that kind of anything that creates stress on the body as a whole can worsen the symptoms of an underlying dystonia, whether it's an independent dystonia or the dystonia that we see with Parkinson's disease. Patients will often comment to us that if they're feeling fatigued, not sleeping well, that they'll notice that their dystonia and other symptoms might worsen in that period. Even being sick with something affecting the body like the flu or something like that, can also cause a person's symptoms to worsen. So kind of the lifestyle, healthy lifestyle, that Brian had mentioned is really important in managing those things.

Rachel Dolhun: 52:01 And Brian, anything you would add from your personal experience?

Brian Reedy: 52:05 Yeah, definitely when I'm stressed or when I'm exhausted or feeling apprehensive, the symptoms get worse. Perfect example, this weekend I ended up in the ER for a silly reason. And as they were stitching me up, I definitely had more dystonia in my face and in my hands. That wasn't necessarily a pain expression, but just kind of the stress of the situation I think.

Rachel Dolhun: 52:34 And some definition questions, Dr. Furr-Stimming. One is, we kind of use this word cramping to talk about dystonia. But somebody asks, "How do you differentiate a cramp from dystonia?"

Erin Furr-Stimming: 52:46 Ooh, that's a tough question. Because there certainly is overlap. And I think it really sort of gets back to kind of better understanding and describing, more importantly, to your physician what you're experiencing and when you're experiencing it. Dystonia is really by definition, as we mentioned, sustained contraction of various muscle groups and so it is a form of cramping. But not everything that cramps is of course dystonia. So it really depends on your neurologic exam and the information that you can provide to your physician, to your neurologist, about when the cramping occurs and where it occurs, that hopefully can help us put all the pieces together and determine whether or not it is actually dystonia.

Rachel Dolhun: 53:37 Taking a picture, a video, or things like that, does that ever help you as a physician? Asking your patients to take a-

Erin Furr-Stimming: 53:37 Absolutely.

Rachel Dolhun: 53:45 Yeah.

Erin Furr-Stimming: 53:45 Yeah, that's a fantastic idea. It really can help, because more often than not, everything is pretty perfect when our patients come to visit us in clinic. And that can be very frustrating. It's just like taking your car to the shop. So if you can bring some information from your spouse and/or even better a visual and a video or a picture, that's fantastic. It's more information for us to try to help our patients.

Rachel Dolhun: 54:13 And Dr. Kim.

Christine Kim: 54:15 Oh, you took the words right out of my mouth, actually. I was going to mention the same thing.

Rachel Dolhun: 54:20 Another thing that can be confusing and sometimes video can help with this too, or pictures, what's the difference between dystonia and dyskinesia, Dr. Kim?

Christine Kim: 54:28 Yeah, so they are on a continuum. So they can definitely be confusing. Dyskinesias are more typically the kind of excessive and sometimes repetitive movements that can occur more often as a side effect of the levodopa itself. Dyskinesias, like dystonias, can occur both as a direct effect of the peak dose of the levodopa and then more uncommonly as the levodopa is wearing off. But we think that they're, in the setting of Parkinson's disease, kind of on a spectrum. And one clue for that is the fact that they do kind of behave in this similar way in relationship to the levodopa.

Rachel Dolhun: 55:15 Very helpful. I think that's a common point of confusion for people with Parkinson's, and sometimes even their doctors. So it can be tough to parse out. With that, we're wrapping up. So I'd like to give you each an opportunity to say one final thing about dystonia or Parkinson's or research to our audience. So Brian, can I start with you?

Brian Reedy: 55:36 Well, the one thing I was just thinking as I was listening to this last question is, it's definitely, with me, 'cause I do get a lot of the cramping and I have dyskinesias, the dystonia for me is more that prolonged cramping or curling. But no, I think this discussion has been fantastic. I've really appreciated listening to everybody, and I've learned a great deal through it. I'm really glad that you guys have done this, thank you.

Rachel Dolhun: 56:04 Thank you. And Dr. Kim?

Christine Kim: 56:06 Yeah, thank you so much for having me. I just wanna emphasize that there's really great treatments available for dystonia as bothersome as it can be. And with good tailoring, we're really able to come up with good plans that really improve the quality of life.

Rachel Dolhun: 56:23 And Dr. Furr-Stimming?

Erin Furr-Stimming: 56:25 Yes, and I would agree with everything that's been said. Thank you again for having me, and just I would like to stress the importance of working with your physician. We have fantastic patients that we are able to work with. And it really, when it comes to PD, Parkinson's Disease, it's certainly not a sprint. It's a marathon. And so it's about working closely with your team. It definitely takes a team, and providing as much information as

possible so that we can work together to try to improve our patients' symptoms and optimize their quality of life.

- Rachel Dolhun: 57:00 Well, thank you Brian, Dr. Kim, and Dr. Furr-Stimming, for sharing your expertise with us today. And thank you everyone for joining us. Mark your calendars for our next webinar on October 18, where we'll be discussing off episodes in Parkinson's, where your symptoms can reemerge or not be as well controlled. We'll have staff behind the scenes to answer your questions live then. I'm Rachel Dolan, vice president of medical communications at the Michael J. Fox Foundation for Parkinson's Research. Thank you everyone for joining us.
- Michael J. Fox: 57:32 This is Michael J. Fox. Thanks for listening to this podcast. Learn more about the Michael J. Fox Foundation's work and how you can help speed the cure at MichaelJFox.org.