

Michael J. Fox: 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.

Intro: You're listening to audio from one of our Third Thursdays 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 Thursdays Webinars at MichaelJFox.org/webinars. Thanks for listening.

Brian Fiske: Hello everybody. Thank you for joining us today. I'm Brian Fiske, senior vice president of Research Programs here at The Michael J. Fox Foundation for Parkinson's Research, and I'm going to be your moderator for our discussion today. All right, so let's get started. So what are we going to really talk about today? We're going to be talking about what is really an important issue for people with Parkinson's disease, and that is certain symptoms called gait and balance problems, or sometimes you might hear gait, balance and postural instability problems. These can occur with Parkinson's disease, and they really represent some real challenges for people who struggle with Parkinson's. So we're going to be talking today about what these symptoms actually are. We're going to talk about some of the current treatments people use to try to address these symptoms, and then importantly, we're going to talk a little bit about ... sort of gaze into the future about some of the approaches people are working on to better address these really problematic symptoms.

Before we do that, let me introduce our panel. We have a great couple of guests today who are going to help us unpack and walk through this issue, and I'm going to start first with Anne Kloos, who is a physical therapist and professor at Ohio State University. I'll also say that she just recently received a grant from the Foundation on some work to look at gait issues in Parkinson's, so we're excited about our ability to work with her on that. And hopefully we'll have time later on the call today and she'll give us a little more information about that project. Hi, Anne.

Anne Kloos: Hi. I'm excited to be here to share some of my knowledge and experience about gait and balance problems in people with Parkinson's.

Brian Fiske: Great. Our additional panelist is actually Israel Robledo. He's actually from my home state of Texas, and he's also a member of the Foundation's patient council. He's actually been a really great advisor to us on some of the funding programs we've launched and supported to try to address issues of gait and balance, and he's here today. He's going to talk to us about his own personal experience with this issue, and some of the challenges he's faced, and how he deals with that. So thanks for joining us today, Israel.

Israel: Oh, you're welcome. Thank you for letting me join to be part of this.

Brian Fiske: Great. All right, let's get started. Let's start first with just again understanding and level setting. What are the symptoms we're actually talking about here when we talk about gait, balance and posture? So Anne, could you just walk us through these symptoms? What really are they? How common are they in Parkinson's disease? From your perspective, if you could just walk us through this.

Anne Kloos: In terms of the gait, the problems that we usually see are problems in general with walking, with the flow or speed. The steps tend to become very short and shuffling, and there's a reduced amount of arm swing. And in later stages, some of the individuals will report that they have freezing of gait, and this is commonly reported as a feeling as if their feet are glued to the floor. There's lots of different triggers that can make people have these freezing episodes. Sometimes it's whenever they start to try to walk, when they're turning, when they're going through a tight place, such as going through a doorway or they're in a big crowd of people, or it might be when they're getting near a target, like they're getting near to a chair. It's estimated that about 50 percent of people with Parkinson's disease have freezing of gait in the later, more advanced stages of the disease.

Balance is often affected in Parkinson's, and it leads to a lot of unsteadiness and postural instability when the person is standing, they may be swaying more than normal, and also it can affect their dynamic activities, such as trying to stand up from a chair or reaching to pick up an object from the floor. This balance control problem can lead to falls, and although falls are typically not seen in the early stages, they do become more prevalent as the disease progresses into middle stages. And approximately 70 percent of people living in the community with Parkinson's have fallen in the previous years, and we know that people who have fallen two or more times in the previous year are very likely to fall again in the next three months. There's a significantly higher incidence of limb fractures to people with Parkinson's and this is probably due a lot to the gait and balance problems, and it's been shown that about 27 percent of people experience a hip fracture within 10 years of their diagnosis.

Postural changes also occur, and the typical kind of change in terms of the posture with Parkinson's is a stooped type of posture. The person tends to lean more forward with the trunk, and there's an increased amount of bending in the hips and the knees. And also, along with that, there is a decreased reflexive response to balance disturbances. So you often see, it might take a person with Parkinson's multiple steps before they're able to correct a loss of balance. So these changes, this forward leaning and the lack of automatic responses to balance disturbances again put people at a higher risk for falling.

Lastly, I'd just like to say that cognitive changes are also known to affect people's ability to divide their attention when they're doing more than one thing. We call this dual tasking. Say if you're doing two things at one time, like walking and trying to talk to somebody, or you're doing a second task, and we know that many people with Parkinson's have difficulty with that, doing

sometimes two things at once or multiple things, and that can also contribute to their gait and balance problems.

Brian Fiske: Thanks, Anne. I think that last point is really important. I know my team and I, a lot of the proposals that we look at, we really appreciate how complex the brain systems are that control all these different gait, balance and postural systems, and how something like your ability to, as you said, multitask and think can really reek havoc on some of that when they're not working as well as they should. Israel, I wonder if you could, now that we have the more formal definitions of some of these symptoms and issues, could you bring it down to the personal level and talk a little bit about what of these symptoms are most impactful on your daily experience with Parkinson's? What is most troubling for you?

Israel: Sure. For me, the phrasing of gait is the most difficult because it comes with no ... at any time, it can come at any time, but the issue with it is it can be embarrassing if people are around you, and it can be a lonely feeling because people may look at you, and even if they don't, sometimes you feel like you're not able to do things that normal people do. In my case, I've had issues with some falls, and what's interesting about falls is that most of the time when people fall, they're able to catch on to something or hold on to something to stop the fall, but in my instances, I am literally walking, and all of a sudden I'm on the floor thinking, "What? What just happened?" And it can give you worries over a long period of time because you have no idea what's going on.

And the other thing for me is, I call it the walking soldier start. I lift my leg to walk, and I literally have to flip my leg to the sides so that I can catch my balance because initiating the walk is just not there, and that's something that I deal with more and more. And I think with many people with Parkinson's, the enclosed areas, I find myself doing the shuffle, trying to get myself out of those areas, and in my case, the ever present doorway that tends to give me lots of bruises.

Brian Fiske: Right. The doorway example I think is important. Anne, could you explain a little bit what Israel means by that? When we talk about people sort of freezing in doors. What's going on, do we think?

Anne Kloos: Well, there is some evidence that perhaps people with Parkinson's might have some changes in their perception, where they are seeing things as being more narrow or more close to them than they actually are. So this might be causing them, when they get near something that seems a little bit tight or narrow, that they just have this response where they are basically frozen and can't keep walking forward. So there are definitely some strategies that have been shown to help people a lot with those freezing episodes. It seems to be a problem a lot of times of shifting your weight, so just to get yourself going. So rocking back and forth to get some shifting of the weight, and at the same time, thinking, "Take a big step," can sometimes get people going again. Another strategy that works really well is just to step backwards first and then forward, and just by

doing that, again, it's a weight shift, and that helps the person then to be able to go forward.

For instance, like with a doorway, just in general, when people get frozen, it sometimes helps to look ahead toward the target that they're trying to go toward. So, if you're trying to get through a doorway and you can't get through it, try to focus on something that's past the doorway that you're trying to go toward, and at the same time, you should be thinking, "I want to take a big step." And even sometimes people count, just counting steps, or even singing a song with a beat, or something that is a cue to get the person stepping and continue to step as they're going through the doorway instead of stopping might be helpful.

Israel: The the other thing I know for me has been an issue is not only in entering the doorway, but actually hitting the door frame, and I've often shared that my vocabulary went way higher in number when I started getting those episodes because I was bruised on my shoulders and on my elbows every time I walked through the doorway. And it wasn't a good vocabulary, needless to say.

Brian Fiske: It was a four-letter vocabulary, it sounds like. Let's look at the segue. Why don't we move over onto actually talking about, again, some of the ways, and Anne, you were great talking about some of these approaches. Some of the ways we can address these symptoms today, so maybe some of the approaches doctors and people with Parkinson's are using to try to address these. I've kind of categorized them here broadly around medications, exercise, physical therapy, and then I think what you were just getting at, some of the tools and tricks you can use when you're dealing with a freezing episode or something like that. Anne, do you want to walk through, again, broadly what are the different strategies doctors try to use today?

Anne Kloos: Well, with medicine, I think the gold standard now is levodopa and definitely in terms of people who are on Sinemet or some combination where levodopa/carbidopa, basically it does improve, it definitely does improve gait for many people, especially gait speed and the length of their steps are improved. In terms of levodopa and balance, though, they find mixed results. Some people might have some improvements, but others actually get worse on some types of balance, particularly static, standing balance. However, levodopa does seem to help with dynamic balance, so when you're walking or doing some movement. So that is pretty much the gold standard. Of course, there's a variety of other medications that are out there, and that is something that is up to the physician or neurologist to work with the person with Parkinson's and find the best combination of medications that's going to maximize the amount of function they have. It sometimes takes a lot of adjustments and things to find that.

Brian Fiske: Trial and error, yeah.

Anne Kloos: Yeah, that's what needs to be done with medication. Now, in terms of other non-medication type interventions, I would say physical therapy would be at the

top of that. There's a lot of evidence that suggests that people do improve when they have therapy in terms of gait and balance. I really want to emphasize to everyone out there who has Parkinson's that if you haven't seen a physical therapist, I would highly recommend it. The sooner you can get into a therapist, the better. What the therapist can do is to do a thorough assessment of their function and be able to assess which types of exercise interventions or other types of interventions that can actually help the person to maximize their performance.

So what we know is that one type of exercise doesn't fit all. Exercise needs to be very much individualized to whatever the impairments of that person are. So a physical therapist can help sort that out.

Brian Fiske: Are there particular types of physical therapists you should look for if you're looking for a physical therapist? How movement disorder specialists are for doctors, but is there a version of that for physical therapists?

Anne Kloos: Yes, I would highly recommend people who are board certified in neurologic physical therapy, and in general, these people have really specialized in working with people with neurologic disorders. You can go onto the American Physical Therapy Association website, and they do have listings where you can find people perhaps in your area who are these neurologic specialists. So that would be what I would first recommend, but there are also people who maybe are not certified, but who have a lot of experience working with individuals with neurologic disorders, so the thing would be to find a therapist who has that kind of experience.

Brian Fiske: Right. Israel, what about you? What kinds of approaches have you used or are currently using to try to deal with some of these symptoms?

Israel: For me, the most important part of my Parkinson's journey has been staying physically active and mentally active, which has helped quite a bit, so when I do have those issues of freezing, and of gait and balance problems, I know that there are some things going on that are beyond my control at this time. I wanted to touch back on medication part that Anne mentioned. I think that's an important aspect of when you visit with your doctor. If you can list the top two or three things that bother you, so you can have a good conversation within the visit that's scheduled so that you're not leaving there saying, "Oh my gosh, I forgot to ask this." Or, "Oh, I should have said this." I think with medications especially, if you're not sure that it's supposed to help or you think it might help with balance, those are the times to ask because once you're gone, it's very difficult to have those questions answered in the long term. So I think that's an important part of this. But yeah, just exercise for me has been the most important.

Brian Fiske: For the doorway challenge you mentioned, any of the tricks that Anne mentioned before, were any of those ones you've tried? To get yourself going through that doorway?

Israel: Looking ahead is, and what's so interesting is when I mention the bruising, it's almost like a magnetic force that brings each at each side. I know people that said they look like drunk sailors when they're walking, and you could try to hold your elbows close to your body, and you get to that doorway, and they just pop outward. It's the weirdest thing. If you could have somebody videotape that when it happens, you're thinking, how can that be, but Parkinson's is so complex, and it just reaches the whole gamut of issues. But yeah, gait and balance especially, because of the effects it can have on falls and other issues resulting from that.

Brian Fiske: Anne, did you have a comment?

Anne Kloos: Yeah, I would totally agree. One thing in terms of medications I always advise is if there is some sudden change in the person's function, they're not functioning as well in a relatively short period of time, or they're spending a lot of their day feeling like they can't do the things they want, that would be a good time to go and see your physician. And find out if there's anything they can do, in terms of adjusting medications to make that better.

Brian Fiske: Really important point. So we talked a little bit about what we can try to do today with some of the approaches people are using. Let's come out and look a little bit into the future and think about some of the approaches that are being looked at as potential solutions for this symptom or set of symptoms, and so I've listed a few categories. I'll walk quickly through these, and then I may have Anne touch on a couple of these, but I think there was actually a question from one of the listeners about the role of deep brain stimulation and brain stimulation approaches around gait. Certainly there's current deep brain stimulation approaches, and we can talk a little bit more about that. But people have also been looking at that concept I think, of brain stimulation and different parts of the brain to try to address some of these issues of gait and balance.

The brain of course, is this very complex organ, and trying to figure out where to stimulate, where you can do this type of approach in the brain to try to address these gait issues has been something that people have been looking at for a couple of years now, and trying to figure out how to optimize that. Medication-wise, we talked a little bit about this idea of the potential link between thinking problems and gait and balance and posture issues. There's actually been some work and some trials, including some work the Foundation has funded to try to actually test some of these drugs.

There's for example, some drugs that are currently used in Alzheimer's disease to deal with some of the cognitive and thinking problems. They're trying to actually test those in people with Parkinson's as well to see if that, by potentially improving some of the cognitive issues that people with Parkinson's also suffer, could help with some of the gait problems. This is still exploratory, but there are a number of groups that are trying to look at that as well. There are a lot of devices, and we'll talk about this more in a moment, so I think a lot of different technologies and devices people are developing to address gait and balance

problems as it's happening. So there are a lot of different ideas, and tricks around getting through the doorway, and counting, and things like that.

But there are devices that can also potentially help by providing visual cues, auditory cues or different types of cues to trick your brain into restarting and making that movement hopefully a little bit. There's a host of different ways people are looking at either trying to use certain existing approaches, or novel medications to try to get at this problem of how to treat gait and balance. Anne, I wanted to go back to the brain stimulation stuff, and wonder if you could talk a little bit about some of that. Actually we had a question from I think Robert, who was on the call, and he was just curious about the impact DBS has on gait, and where we're learning anything new there. Is there any optimization that's happening in that space? I wonder if you could comment on that.

Anne Kloos:

Sure. Definitely there's a lot of research ongoing about deep brain stimulation right now, and one thing I do want to mention though, is not everybody is a candidate for that. It's typically people who are not adequately controlled with their medication, and you still have to be responsive to levodopa in order to be typically, a candidate. But definitely they have found that deep brain stimulation, particularly in the areas of the subthalamic nucleus and the globus pallidus, which are both within the basal ganglia, often brings on improvements in people's gait, particularly improving gait speed, and stride length, so that people can walk better. Again though, not everybody exactly has the same responses, the same levels of response.

Some may get more of a benefit than others. And in terms of they've also looked at how DBS can affect balance. And in that area, it's an equivocal source of findings, some people do tend to be better. Other people though, actually some get worse in terms of their balance. So that's an area they're still continuing research and they're trying to find the best stimulation parameters, the best areas, to be able to get the best effect for the person.

Brian Fiske:

Right. Israel, any thoughts here? I know some of these are emerging and not necessarily approved treatments, but any types of approaches, maybe even devices, that you're looking at or they're excited about, as they could be potentially helpful for you?

Israel:

Yes, the most exciting devices for me are the wearables. Not necessarily just any wearable because there are some that are cumbersome, but they're looking at developing. For me, I find when I'm looking at different ways to help people, whether it's reviewing a grant or anything, it's how feasible is it, how accessible is it to the wider community, and is it something that can be used simply without much to-do about anything else? Because a person who has those issues, doesn't have the ability many times to wear a cumbersome device. There are some devices, like I said, they're very promising for me, and I just look forward to seeing those results come out from those studies and see how we can help many more people. That's an exciting area for me.

Brian Fiske:

Great. So maybe it's a good segue and we'll talk a little bit about, the Foundation last year, we launched an interesting new funding program. It wasn't the first time that we focused on funding research in gait and balance issues, but this program in particular was nice because it really was focusing on approaches that we felt were a little bit more near term to helping people. With the goal of looking for devices, and existing approaches that could be quickly tested in people who have gait issues to see if they actually show any benefit and the idea that if they do show some benefit, we can hopefully very quickly move them into practice. So it was an interesting program for us, we got a ton of interesting, great proposals. I know the team here had a really good time looking through them, and learned a lot about this issue.

Israel, we're really thankful to have you as one of the reviewers on our committee too. It was really helpful to have your perspective as you talked about as well, but we're excited that we were able through this process identified about eight projects totaling about \$3 million of research that we're going to be funding. The next couple of weeks or so, we'll be able to announce more formally the projects that we did identify through that program. But just to give you a broad flavor, I think they ranged across the board. We had a number of projects that were looking at different types of exercise and physical therapy approaches. We had a number of proposals on looking at it through different types of assistive devices. We had a number of projects that are using these, what we call cueing systems we talked about briefly before.

The idea of providing some sort of visual or auditory or even a tactile, touching vibratory type of cue as a way to help someone deal with their gait or balance issues. Even kind of a cool one, looking at use of virtual reality. Can we use the virtual reality approaches to help people navigate the world around them and maybe also help deal with some of their gait issues. Again, a lot of really cool devices. Again, one of the assistive devices we're looking at is a wearable air bag technology, so again it may not prevent you from falling, but if you are going to fall, it could be helpful in preventing injury from that fall. So again, super exciting. Anne, I wonder if you could talk a little bit about the work you're doing? As I said before, you're actually one of the people we're going to be working with through this program, and really excited by that. So you want to talk a little bit about some of the work you're doing?

Anne Kloos:

Sure. I'm really excited. Our lab is a lab we work on gait and balance interventions for people with Parkinson's and we're excited because there is a new device that just came out. Honda manufactures this, and that's a device called the "Honda Walking Assist Device," which it's a wearable, robotic exoskeleton. So the person can put this on around their waist and thigh and is very lightweight. It's really easy to put on and off. When the person is wearing it they can turn it on. It can be set to parameters that are best to help the person with Parkinson's. What it does is when a person tries to take a step and if the step is a very small step, what it does then is a motor will actually within this exoskeleton, will actually kick in and help the person to take a bigger step.

What we're hoping is that this will allow people with Parkinson's who are having those shorter, shuffling steps, or maybe freezing of gait, to help them then take bigger steps. That way they can walk using a more normal type of gait pattern, and over time we're hoping that if they practice with this assistive device on, and they're walking in a more normal pattern, it will have an effect on their brain, so that when they're not using the device, they may have improved gait. We're planning on testing this. We are recruiting people. We are in the Columbus, Ohio region, so this would have to be people that live within this central Ohio region, because we're going to be going into people's homes and a physical therapist will then administer the intervention using this device in people's homes. It'll basically be them practicing things, doing things around their home, and also out perhaps in their community.

Brian Fiske: Great, that sounds exciting. Now is this something that would be worn under clothes, or you'd only wear over your clothes while you're exercising, as you say. How would it work in real life?

Anne Kloos: It would be over. If you were wearing a really big shirt, you could have it on top of it. But it's worn over a pair of pants the person has on. But yeah, you could probably hide it to some extent, although it does attach to the upper leg, and so people would probably be able to see that. It can't be completely hidden.

Israel: Anne, I was going to say. In this specific instance, I think even though there is a bit of bulk within the protocol that you're going to use, I don't think people would mind using it, because it's a training device, and if I remember correctly, it just prompts the person to start the walk. It's not a robotic, pushing your legs. I look forward to seeing what comes out of this because as I said, a little bit of bulk is not a bad thing. Especially if it's going to help people, and I don't think people would mind wearing it in public.

Anne Kloos: Israel, you're right. It only just helps a person, and it's pretty gentle in the way that it assists the person, so it doesn't knock them over. Yeah, it won't kick in unless the person really needs it, is how it works. So we do think that ... there has been trials in it, in Parkinson's before, and it has been beneficial. So we're hoping that this'll be the first time that we really look at a larger number of people and see if indeed we do get some promising results with it.

Brian Fiske: Israel, your name is lighting up the question board right now. A lot of people were interested, you made a comment before about your excitement around some of the wearable type of approaches, and I'm curious again, if you want to touch on that further. Are you utilizing any types of wearable approaches to help address this issue, or is there anything that you're most excited about in this space?

Israel: I'm not currently using anything, but what has interested me are the wearables on the feet that you could actually use with a regular shoe. This device that Anne has talked about is one that intrigued me because of the fact that although it's an external wearable, has a bit of bulk, it does allow for people to

continue functioning as best as they can. So without ... the excitement in the ability to have some of these wearables across the whole gamut of people with Parkinson's is exciting because what we're looking at is it feasible, is it affordable for people? In the back of my mind as we were reviewing grants, a lot of it was, as a patient, what are we looking at, and some of the parameters were we want some of these devices to be available to the patient population within two years. When you're reviewing grants, some of those ideas are further out than what you're looking for. They may be good ideas, but some of the great ideas are the ones that you say, "This has potential for a lot of people."

Brian Fiske:

It's interesting I think, that in this wearable question and this isn't the topic of the webinar today, but the use of wearables not necessarily always as treatment, but as tracking and measuring devices. I think one of the things you're alluding to Israel, from the review program from last year, is a number of projects we got where there were initially needing to use wearable approaches to measure gait and balance and posture in people with Parkinson's because we still don't really have good knowledge of the different factors and the different things we can measure that might predict someone who is maybe about to fall or about to freeze, or something like that. By having more knowledge of that measurement piece of the equation, you could then develop better technologies that could detect that you are about to freeze or you are about to fall. Then presumably trigger a mechanism, such as a cueing device or something else to let you know that's about to happen so you can try to prevent it from happening.

I think you're right, we try to focus in this program on some of the ideas that were maybe a little bit closer to application, but I think there was some really exciting work that was maybe a few years, sort of longer horizon that was looking at the more use of wearables to detect these particular symptoms. I know from the Foundation side we're very interested in that area. We fund it through a variety of other different programs, but it's something I think we're seeing that convergence of technology today. Are these different wearable devices and the computing power we have to analyze the data coming from those devices to try to make meaningful predictions about these symptoms in people and then using that information to guide some of the treatments. I think we're really seeing some exciting work that's happening here.

I'm mindful of time and I definitely want to get to as many questions as we can, so I'm going to switch us to the formal, official Q&A period. Like I said, the question board has been lighting up, so I'm going to do my best to walk through some questions. I may bundle some of these because I think a number of people are asking probably related questions. Let's kind of go back to the beginning a little bit. Anne, I might ask you to help me with this. There were a number of questions I guess where people I think just wanted some more clarity on again the prevalence of these symptoms in Parkinson's. Do certain people show these, not everybody? Are there certain types of Parkinson's disease that are particularly prone to gait and balance issues? Also, I think you had mentioned when these symptoms start to appear, is it something that only happens later in

the disease, or can it happen earlier? I wonder if you could touch on some of those points again.

Anne Kloos: Okay. Well that's a really good question because if you just have your typical type of Parkinson's, the sporadic Parkinson's disease, you don't expect to have a lot of gait and balance problems in the beginning, but those will develop though. I mean I don't know that anybody doesn't have some types of gait or balance problems as the disease progresses and gets more into say the middle or later stages of the disease. But in terms of do some people get symptoms earlier in the disease, yeah. There are some individuals, it's a more atypical type of course where some people do develop more gait and balance problems earlier and it's kind of a variant, but that is not the majority of people at all. Most people will not have any gait or balance issues until kind of in the middle.

Israel: I was going to say for some people there is no tremor involved with the initial symptoms, but for some, like in my case, I did have the posture issues that when I was diagnosed, the doctor said you have two of the four, or actually three of the four cardinal symptoms, so I'm going to diagnose you. It's a very good point that Anne made is although you may not have it initially, more than likely it will come, but for some of us who have that issue from the very beginning it can be more worrisome I guess in so many ways. But again, it's something that we're working on. I say we're working on, I mean people are working on making that better for all of us.

Brian Fiske: Right. Maybe for our callers who aren't totally familiar with the issue that Israel's mentioning, a lot of neurologists will tend to sort of categorize their patients in two buckets. There's the people with Parkinson's who generally present mostly with the tremor dominant as they say from where that tremor symptom is particularly noticeable early on, and then there are others who don't really have the tremor but tend to have more of the posture gait issues early on. We don't know for sure whether these really are two distinct types of Parkinson's disease or whether they're just some of the randomness of which symptoms happen to appear first in which individual, but I think it is an interesting point that there at least some people where maybe some of these gait and balance issues come on a little bit earlier than other people. It's an important conversation obviously to have with your neurologist, with your doctor, to understand this is an issue that you need to sort of deal with sooner versus later.

Anne Kloos: Right. It's all the more reason to get going to physical therapy as early as possible.

Brian Fiske: Right, which actually is sort of the second question I have. This was a question from Gloria who asked I think a straightforward question, "How can you stop a fall, and should you even try?" If you're struggling with posture and gait and you start to fall, are there any best approaches to try to reduce potentially harming yourself? I open it up really to both of you on what your thoughts might be there.

Israel: I think awareness of your surroundings. It's easy to say but it's difficult to do, but if you have the issues of perhaps balance problems, you're going to be more cognizant of where you are, where you're standing. That's just a personal thing that people do. I tend to lean on the wall so that I'm not in the middle of the room. Certain things, holding onto chairs, just subconsciously many times. Anne, I'll just let you take from there.

Anne Kloos: That is definitely true, being aware of the environment, making sure that you're not tripping over things, the environment is clear is very important. In terms of stopping a fall if it happens, you know a lot of times I don't think people can actually do that very well, but of course you want to fall so that you don't fracture anything if you can. Trying to avoid sticking your hand out there, or landing on your hip so you break your hip or something. I think that would be better than if you're able to try to kind of cushion the blow, or just sink down slowly if you can. But a lot of times I don't think people can really stop it if it's actually happening.

What I would say though is if a person is starting to experience falls, that is a good time to go to therapy, physical therapy. Get an evaluation because basically if you can get on to maybe some balance training exercises you may be able to actually improve your balance and prevent yourself from being at high risk of falling. The other thing would be that if you are really falling a lot and you're afraid you're going to go out and fall, you may be a candidate for perhaps using some type of an assistive device.

We actually did a study here at Ohio State looking at how using different types of assistive devices like canes, or different types of walkers, how they affect a person's ability to walk who has Parkinson's. We found that the four wheeled walker, which is a rollator type walker, was the best type of device. It can help people to walk actually. They can walk better, they have more normal gait pattern, and it can prevent the person from falling and allow them to go out in the community without so much of a fear that they're going to fall. That would be something I would recommend. Again, the therapist could evaluate the person and decide okay and maybe do a combination. You could do some exercises to try to boost your whatever balance you already have and make it better, or if needed use some type of assistive device.

Brian Fiske: Right. I think it's important this concept of fear that you raise and how that can be really impactful, almost symptom in a way, that can prevent you from doing things that you enjoy. Israel, when you're dealing with issues like falling and those kinds of things, how do you sort of address that fear issue? Is it like you said using these devices, is it doing some other kind of approach that can help you just not feel so afraid to go out and walk?

Israel: I think the most important thing to focus on is taking big steps, being confident to the extent that you can so that when you are finding yourself in those tight spots you know that there's a difference in what you're doing and you can overcome some of those things. For example, small confined spaces for me, I

tend to do the shuffle. I go in circles. I know that in tight spaces I have to be there sometimes in the kitchen, but at the same time I know that that's not going to be my whole life, my whole day, what I experience every time. It's just being confident in my stepping abilities, which is not easy to do, especially if you have had some falls. But I think the more confident that we are as people with Parkinson's, the better off we'll be in many areas of our lives.

Brian Fiske: Right. Anne, we're getting a number of questions that people have on the different types of physical therapy approaches. Are there particular exercises or again training approaches that you feel seem to work better with certain individuals? Even some people are asking about doing boxing and things like that. Is there anything that sort of feels like it can help with these issues?

Anne Kloos: Yeah, that's a really good question and there's quite a bit of evidence that's emerging. I would say in terms of gait the best intervention that's been shown with evidence is treadmill walking, treadmill training. Basically it's been shown to really help with increasing walking speed and step length. That's something that I highly recommend for people that have gait disorders. Basically when you talk about the exercises, we know that the effects of the exercises are kind of specific to the type of task that you're doing. If you want to get better at gait, you have to practice doing walking. As Israel was saying, for instance, the main thing that we try to tell people is that when you're walking try to take big steps. You want to try to counteract these small shuffling steps and take big steps. By taking big steps it actually makes you walk faster too. That's a big thing.

But other types of interventions like dance, there's evidence that dance can help. They've done studies with tango dancing, ballroom dancing, salsa, Irish set dancing. Dancing seems to be good for balance primarily because you have a lot of stepping in different directions, you have to shift your weight from one leg to another, and it seems to have a really good effect on dance and also a smaller effect on walking as well.

Brian Fiske: And probably mood. It's probably fun to do too.

Anne Kloos: Definitely. Particularly with dancing they looked at tango either with a partner or without a partner, and they found that it's equally beneficial either way, but the people who had a partner were saying that they really enjoyed it a lot more and that they were more willing to continue doing it. It's kind of up to the person, but you can do it either way and get a benefit. Tai chi is another area. There's definitely evidence that it will help with balance and gait in people with Parkinson's. Again, that's a thing where you can see with Tai Chi they're nice smooth types of rhythmic movements, and there's a lot of weight shifting, like from one leg to another. That can really help with balance.

Another exercise that's pretty easy for people to do is cycling on a stationary bike. It also, if you think of it, cycling is a lot of rhythmic movements of the legs that are very similar to walking, and so it has been shown to have beneficial effects on walking. There's even some people that have done experiments

where they set the bike to actually revolve at a speed that was higher than the speed the person with Parkinson's could actually do on their own. That intense kind of exercise on the cycling was more, did have definitely very positive effects on gait and mobility after the intervention, so that's another thing that could be done.

There are, as you mentioned, some other things like boxing, yoga. There is also this LSVT BIG type of exercise. These are all programs that you could do perhaps in the community with group exercise classes. The evidence isn't as great in terms of their ability to improve balance and gait, but certainly people are reporting that. We have these types of exercise classes in our community, and people that I talk to with Parkinson's who've gone to these classes do report that they're getting benefits from it. There's just a really, there's many different things out there that could help. I think it's really kind of the person needs to find what type of exercise do they really enjoy doing.

Brian Fiske: I agree.

Anne Kloos: Out of these choices.

Brian Fiske: Good for all of us, yeah.

Anne Kloos: Yeah, because the key is that you have to keep doing it. If you quit doing the exercise, you won't get any benefit.

Brian Fiske: Israel, can I flip it to you. Any advice on the exercise front? Is this something that you try to do?

Israel: It's more the active lifestyle, especially being able to work full time. I'm still working full time as a school teacher and I tenure at five campuses, so I'm always on the go and working with my students and moving from campus to campus. At the end of the day I'm worn out, but I think that kind of helps that activity level. I don't do high impact exercise, and it's mostly walking for me. If it is, it's on a treadmill. Of course it's different for everyone, but just staying active I think makes a world of difference for all of us.

Brian Fiske: Great. Well I think on that note, that was great advice I think to end the call on. Thank you everyone for joining you today. Hope you learned something new today. Really big thank you to both Anne and Israel for sharing your expertise and your views on the call today. Really, really valuable. Thanks again so much and we look forward to having you join us next time.

Michael J. Fox: 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.