

## Episode 106: Tremors: Coping & Treatment Options

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**Dan Keller:** Welcome to this episode of *Substantial Matters: Life and Science of Parkinson's*. I'm your host, Dan Keller. At the Parkinson's Foundation, we want all people with Parkinson's and their families to get the care and support they need. Better care starts with better research and leads to better lives. In this podcast series, we highlight the fruits of that research, the treatments, and techniques that can help you live a better life now as well as research that can bring a better tomorrow. About 70% of people with Parkinson's disease experience tremor sometime during the course of their disease.

Any two of the four cardinal symptoms; resting tremor, rigidity, postural instability, and bradykinesia, together can establish a diagnosis with or without one of them being a tremor. Tremor can be particularly troubling to people, especially when doing activities requiring fine motor control. The hands are a common sight of tremor but also the chin, jaw, and leg can be involved. Several drugs and other therapies can help control tremor. Levodopa is a mainstay of treatment either alone or in combination with other anti-Parkinson's medications.

Beyond drugs, treatments such as deep brain stimulation and focused ultrasound can benefit some patients. Exercise, stress management, and staying otherwise healthy can all help. When I spoke with movement disorders neurologist, Dr. Muhammad Nashatizadeh, he reviewed some of the drug and non-drug therapies used to control tremor. He started off with a bit of history of Parkinson's disease and explained why a movement disorder specialist is best suited to sort out conditions involving tremor or even to make a Parkinson's diagnosis if tremor is absent. Oftentimes, people think of Parkinson's disease as a disease with tremor, but how do tremors figure into Parkinson's, and how prevalent is tremor?

**Dr. Muhammad Nashatizadeh:** I feel like we've come full circle in the history of Parkinson's disease because when James Parkinson, in 1817, published his initial paper, it was called *An Essay on the Shaking Palsy*. I think most doctors think of tremor when they think of Parkinson's disease. It is one of the cardinal features along with bradykinesia, rigidity, and postural instability. Some people also include truncal flexion or bending of the trunk and freezing of gait in those cardinal features. Sometimes what happens is 20% to 30% of people with Parkinson's disease may not actually have any tremor, and that can sometimes be a source of confusion.

The other end of the spectrum is that other types of tremor can occur and people may not have Parkinsonian findings but because they have tremor, they get misdiagnosed with Parkinson's disease. I may be biased as a movement disorder specialist but having somebody who's very familiar with these tremor conditions can help people sort through what's going on and try to help them figure out where are they going with this and what's their actual condition that they have. The third angle is that there may be an overlapping syndrome. There are some people who have essential tremor and they have some Parkinsonian features, and so they may have multiple types of tremor.

In general, usually people will have tremor at the end of a limb, usually in their hand or foot. Sometimes people can have quivering underneath one side of the chin or maybe in their lip. Some people may have tremor in their tongue. What we don't see much in Parkinson's disease in most cases is some sort of head tremor, whether it's bobbing of the head up and down, yes, a back and forth, or shaking the head side to side, no. Those are some examples of how we see rest tremor in Parkinson's. Usually, people are only having it when they're completely relaxed or not moving.

**Dan:** Are there common myths or misunderstandings about tremor that you run into as a movement disorder specialist?

**Muhammad:** Yes. A lot of times when you consider that most physicians even in their entire training, whether that's medical school, residency, any additional years of training, and even life experience that they have, they may only have, in the United States, several weeks of neurology training. That could be two to four weeks in medical school. Some people have additional training afterward. It's not unusual that people will be told at the age of even 45 or 50, "Do you know why you're having tremor? It's because you're becoming older." That's simply not true.

There are many people even in their 80's and 90's who are very steady and don't have tremor. Being able to identify what type of tremor is happening, and sometimes people have multiple types of tremor, can be very important. The other thing that I think is a common misconception is that depending on the types of medicines people are using for tremor, there may be different mechanisms at play and so sometimes if only one angle or one potential mechanism of action of a medicine is being used, it may be that there are other features that are feeding into tremor, and sometimes different medications can be used.

For example, in Parkinson's disease, it's fairly common that people might have, eventually, some form of levodopa to increase low dopamine in the brain. I run into situations where people think, "Oh, we should try to postpone that as long as possible because there could be problematic side effects or complications from being on levodopa." Other times we may run into a situation where people think that there's actually a maximum daily limit of 800 milligrams of levodopa per day which is based on some discussion that's more than 30 years old. A lot of times the doses have to be individualized for what's going on with the particular person.

**Dan:** Do tremors always progress? Do they stay the same? Can they regress?

**Muhammad:** A lot of times when people first develop idiopathic Parkinson's disease, when I was a fellow actually, there was a study that was published where they looked at the number one presenting symptom or sign of Parkinson's disease. The answer was actually shoulder stiffness. There are a lot of people, especially in the first year or two, where they may only have tremor intermittently depending on what's going on and they come and go. It may not be that much of a problem. Sometimes, actually, spouses or other loved ones or caregivers will identify that this is happening. Then people with Parkinson's themselves may become more self-conscious about it.

Over time, as people tend to lose more and more dopamine, if the tremor is not treated, it can progress. There are situations where when people are on sufficient

medication, if they take the medications late or the medicine wears off where they could have breakthrough tremor. Many times working in the hospital setting, I'll see people who become ill with some sort of an infection or other acute medical problem. Let's say somebody goes into kidney failure or they have to be hospitalized for surgery for some reason. They may end up having worse tremor than usual or regression simply because they're medically ill.

**Dan:** How can people best cope with tremors in daily life? You had mentioned adjusting medications. Are there other things they can do to relieve them or not exacerbate them on a daily basis?

**Muhammad:** Sometimes people, especially when they first start out, they may not be even taking any medications. What I'll often see is that patients will, at first if they're aware that they're having tremor, then they may, for example, cover up the hand that's tremulous with the other hand to try to reduce the visible effects of the tremor. I know that many people who have a different tremor condition, like essential tremor, will often complain about how distressing it can be to go out in public or to go out and have dinner where people will see them shaking especially with movement.

At least with rest tremor, a lot of people can try to cover it up. I've seen people sitting in the waiting room or in the doctor's office actually try to sit on their hand so that their hands will not be visible from the tremor. One of the strategies a lot of people use is to try to keep their hands moving. Most of the time, the tremor will happen only at rest and so as long as people are gesturing with their hand or keeping their hands occupied, the tremor may temporarily go away.

Sometimes this may last for 20 or 30 seconds and then come back. People will often also try to recognize what times of day they may be more likely to be affected by tremor. Then if they are in public, they may reorganize their schedule so that they can walk around that. For the most part, if people are suffering from tremor, they should know that there are treatment options which may be very helpful.

**Dan:** Besides levodopa, are there other medications that are used specifically for tremor, I guess, not getting into every which one and how they act? In general, is levodopa really it or can other things be added?

**Muhammad:** There are other medications that can frequently be added. After more than 50 years of being available, levodopa is still primarily the medication which has the most effect on tremor. Sometimes early on, people will be prescribed anticholinergics. These can sometimes reduce rest tremor, benzotropine or trihexyphenidyl. Other times I find a group of medications that sometimes is underutilized, but has actually been studied in reducing tremor in Parkinson's disease are beta-blockers which are more often used for essential tremor. Propranolol actually can be very helpful.

Some people, as the day goes on, they have more adrenaline or epinephrine, and so stress can increase tremors and beta-blockers may be helpful at reducing these as well. Other times if people are still refractory and still having some rest tremor, a lot of it is the levodopa wearing off, or there are gaps in coverage during the daytime. It's not unusual that people may end up needing four, five, six doses of levodopa per

day as the day progresses. They may simply be having tremor because the medication is wearing off and losing its effectiveness.

**Dan:** How does exercise fit into all of this?

**Muhammad:** Exercise is really a unique angle because there are several mechanisms that may be playing a role. One of them is that when a person has increased circulation, so their heart rate is increasing, it purifies what's going on through the blood vessels. Anything that's accumulating in the body that shouldn't belong there that should be cleaned out by the liver or kidneys is more likely to hasten through the circulation and clear the body. Many times adrenaline or epinephrine is building up in the body. When people first start exercising, some people notice that, in the first several minutes, they may actually be a little more shaky.

Then as they continue to progress through whatever cardiovascular exercise they're doing, whether it's brisk walking, or stationary bicycle, for example, or swimming, that their tremor actually becomes less and less noticeable. Some of that may be the effects on the adrenaline or epinephrine. There are also effects directly on dopamine from exercise. There's been some research looking at boxing, and how either punching a bag or going through the footwork of boxing may actually be increasing dopamine release from the brain. This is a person's own natural dopamine that can reduce some of the rest tremor.

**Dan:** You had mentioned essentially physiologic stress, someone has an infection or they're hospitalized, or they have an initial surge of adrenaline, but what about psychological stress, fatigue, intense emotion? Can those play into this, and can they be controlled?

**Muhammad:** Absolutely, they can feed into this. I think one of the things that I feel is a significant breakthrough in movement disorders in the past 10 years even is that the framework of how we look at tremor, not just in Parkinson's but other tremor conditions, is continuing to evolve as more advanced neurophysiological testing and research-based mechanisms are becoming available. I have a book at home that was published in 2010 that's called *Psychogenic Tremor*. Now we actually use the term functional tremor because some of the circuits in the brain that are affected by things like psychological stress can have an impact on people having different types of tremor.

There are so many connections in the brain from the emotional centers of the brain, the limbic system that can feed in. Many people who practice meditation or prayer or other ways to try to calm their body notice that they may have less tremor from trying to gain the upper hand over some of their emotional feelings. Sometimes people who have Parkinson's disease, most of them are not new to being an adult, they may have been an adult for several decades. It seems that they have to make some changes as they think about the multitasking ability or the ability to handle large amounts of stress because they can end up being more susceptible to having breakthrough tremor or other mobility issues.

**Dan:** What about occupational therapy to help with activities of daily living?

**Muhammad:** One of the things that I think many people find useful, especially early on in the course of Parkinson's disease, is that if they can use special equipment, or if they could use different strategies because people often have quite a bit of experience on how they are doing things, they're used to having their own routines, or their own ways of how they approach whatever tasks they're performing.

Having somebody who's a trained professional occupational therapist, they can break down the process of what people are doing as far as different activities of daily living, different tasks, and be able to say, "I think if you approach it this way, or maybe move the elbow like this, or try repositioning with the wrist, you may notice that you're having better coordination."

Because rest tremor tends to happen more at rest, there's probably less impact from occupational therapy on some of that. There are many people with Parkinson's disease who also have postural or kinetic tremor where if they assume a different body posture where they're actually moving their hands, there may be some mobility. Sometimes as people increase their levodopa dose, they can have more of that different type of tremor as well. Occupational therapy can definitely be helpful.

**Dan:** What about invasive procedures such as deep brain stimulation, or high-frequency focused ultrasound? Are they appropriate at any point?

**Muhammad:** One of the things we run into even before people were using deep brain stimulation is that even back in the 1950s and 1960s, neurosurgeons could actually go in and do a surgical thalamotomy, where they cut the thalamus. This is a permanent lesion. Once those fibers are cut, you can't reconnect them. We don't see that type of surgery being done anymore these days. Deep brain stimulation is not new, it's been around for more than 20 years. There are different locations in the brain that people can undergo surgery to receive stimulation, and then these actual areas can be individually programmed by a neurologist or movement disorder specialists.

You will sometimes see that people who have deep brain stimulation in the thalamus are more likely to have better control of their tremor. For the most part, people with Parkinson's disease usually end up receiving deep brain stimulation in the subthalamic nucleus or the globus pallidus internus. Either one of these may reduce many of the parkinsonian features, especially tremor.

A lot of people who seem to have dystonia may benefit more from a globus pallidus internus or GPi stimulation, but even people with subthalamic nucleus deep brain stimulation will often have better control of their parkinsonian symptoms. The one caveat, though, is that usually, deep brain stimulation is unlikely to be more effective than how well they're doing the best time of day on their levodopa. It doesn't really work more effectively, it's just trying to extend the duration of benefit more evenly and more consistently throughout the day.

**Dan:** In terms of people dealing with tremor, do you see anything coming along? What's ahead?

**Muhammad:** You brought up focused ultrasound. Even though this is not brand new technology, in many facilities, this has not been available. Even just over the past

four or five years, we've seen more and more institutions picking up this technology. Some of it originally came from the technology when people were having uterine surgery, and you could use external sound waves to penetrate the tissue and break up the tissue for surgery. Then people were expanding the use to include external sound waves to the thalamus of the brain where many times the tremor circuitry is affected. This is an exciting technology that's been available.

One of the things that I think is exciting in Parkinson's disease, and I think not just for controlling rest tremor, is some of the vaccine research that's going on. We have different companies that are coming up with vaccines against the alpha-synuclein protein that often builds up in dopamine cells in the brain. Looking forward to see more about those results over time.

**Dan:** I suppose one thing people need to be aware of with something like high frequency focused ultrasound, it is ablative, it actually destroys tissue and you can't turn back. With something like deep brain stimulation, you can turn it off, you can modulate it, things like that, or with drugs, you can adjust those.

**Muhammad:** That's true, although one of the features that I think may be helpful as far as high frequency focused ultrasound is because it's usually MRI guided, what they can do is turn on the settings so that the ablation initially can't cause irreversible damage of the thalamus. Once the MRI follow-up pictures, which are all done right during the entire process, show that you're in the right area and the right tracks or connections of the brain are being affected, then they can turn up the stimulation and actually cause then an irreversible ablation.

The point that you bring up is one that many patients have been discussing with their movement disorder specialists because just the relative permanence of that definitely doesn't sit well with some people. For people who are looking to avoid a more invasive brain surgery, it certainly remains a good option and a newer option.

**Dan:** Is there anything important to add or some sort of nutshell message?

**Muhammad:** I think for the people out there who are listening who are thinking, "I don't really feel like I have good control of my tremor," some of it is making sure you're connected to the right resources. I am biased as a movement disorder specialist, but there are many subtleties about how to micromanage medications or individualized treatments that can be helpful. If somebody had something that was very disabling or distressing, if somebody was diagnosed with cancer, for example, it's not unusual that somebody might seek a second opinion about that.

Tremor is something that also can be disabling and frustrating. Sometimes having a different approach or having somebody just look at what all has been tried to say, "What other angles have we not looked at here?" It doesn't even necessarily have to be that a person has to undergo evaluation for some sort of surgery or other non-medical management, but just to have a different pair of eyes review the situation. Many times people don't have to live with refractory tremor.

**Dan:** Very good. I appreciate all the information. I'm sure our listeners will too. Thanks.

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**Dan:** In addition to seeing a movement disorders neurologist to treat tremor, people with Parkinson's may find help from an occupational therapist who can recommend approaches tailored to their specific challenges. Also, establishing a comfortable sleeping environment and working to relieve physical and emotional stress through meditation or other approaches can be helpful. In that regard, you can check out *Mindfulness Mondays*, part of our PD Health @ Home online program. Just search our site at [parkinson.org](http://parkinson.org) for *Mindfulness Mondays*, or visit [parkinson.org/pdhealth](http://parkinson.org/pdhealth).

You can learn more about deep brain stimulation and focused ultrasound by searching for these terms at [parkinson.org](http://parkinson.org). We'll have another podcast about them coming up in September. In it, Dr. Kyle Mitchell will talk about who is a good candidate for these techniques and what people can expect from them. There's also a past podcast called *What is Deep Brain Stimulation?* You can find our medications for motor symptoms and motor fluctuations and Parkinson's off times fact sheets along with our surgical options, a treatment guide to Parkinson's disease publication at [parkinson.org/library](http://parkinson.org/library).

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