

Living with Tourette syndrome is nothing to be embarrassed about



Journalist Kelsey Christensen breaks the stigma around this misunderstood disorder

Kelsey Christensen went from a shy child who avoided the spotlight to a successful television journalist. Residents of the Twin Cities may recognize her on-camera reporting for *KSTP 5 Eyewitness News*, but others may know her for going public in 2022 about living with Tourette syndrome (TS).

TS is a neurological disorder that causes someone to make involuntary, sudden, and repeated movements or sounds called “tics.” Tic disorders have a range of symptoms. For Kelsey, her tics can include rapid blinking, sniffing, throat clearing, and flexing her neck and wrists at random times. Tics can seem strange to those who don’t understand them, which is why Kelsey started sharing her story after getting a formal diagnosis at age 28. She spoke with NIH MedlinePlus Magazine to raise awareness and understanding of the condition. She wants others with TS to know it doesn’t need to hold them back from living life to the fullest.



FUN FACT

Kelsey is also a certified paramedic. She first became a medic at age 19 and worked part time while pursuing a career in journalism.



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When did you first notice you were experiencing tics?

I was in first or second grade, and I was sitting on the bus talking to a friend. I was kind of shy back then. Two kids turned around and said, “What’s wrong with you? Why are you blinking so much? What’s going on?”

I said, “I am?” And they said, “Yeah, it looks so weird. What’s your deal, what’s your problem?” Then I knew I was blinking a lot more than average. I asked my family about it, and they said, “Yeah, you do that a lot. We just didn’t really say anything.” Except then it prompted my family to ask, “Why *are* you blinking like that?”

The other thing I do is sniff, like pushing air out of my nose. When I was younger, my mom would hear it and ask, “Are you sick? Are you OK?”

How did that feel?

At the time I was painfully embarrassed because I was so shy I didn’t want attention drawn to me, especially if it was negative. So my feelings were definitely hurt when other kids questioned my tics. I remember it very clearly to this day. People can be cruel. I just thought, “Try and blink less.” But obviously we know that’s not possible with Tourette’s.

How long after that did you talk to someone about your tics?

My mom, rightfully so, thought it was stress induced because I had a lot going on with my family when I was young. She enrolled me in karate when I was 6 or 7 years old to try to “fight it out” and gain more confidence through a rough time in my life. But the karate instructors actually said, “I don’t think this is stress or anxiety. This is Tourette’s.”

My tics were a lot worse when I was a kid. There’s a certain amount you can control when you’re focusing as an adult. It’s hard to do it, but you can.

The instructors and my mom talked. They concluded I was better off without medicine at the time. Plus, I was in good spirits. My mom is an amazing mom. She did the best she could considering the awareness level of Tourette’s back then, which wasn’t very well known.

You weren’t formally diagnosed until two years ago. Before that, how did you explain your tics to people?

I didn’t really have an understanding or vocabulary for what I was doing. I figured it was probably something like a tic disorder, but I didn’t know why I was doing it. I’ve had people walk up to me in restaurants and say, “Excuse me, why are you blinking like that?” And I’d say, “Why are you asking me that?” Usually when random people ask me about it, I take that approach. Friends wouldn’t ask about it too often because it was just something I did—“That’s just Kelsey.” My ticcing was often just brushed to the side.

When my Tourette’s was officially diagnosed...it wasn’t shocking because I figured that’s probably what it was. The karate instructors were correct! But having the official diagnosis gave me so much clarity and confidence because I finally had an answer I could give to anyone that asked...and most importantly to myself.



When reporting in the field, Kelsey can manage her tics with concentration and stress management techniques.

Before my diagnosis, I often worried whether my coworkers thought I might be nervous because I was blinking or clearing my throat so much. But now I can say, “No, I am not nervous. I just have Tourette’s, and this is what happens.” The diagnosis is powerful and validating.

Did you ever try to manage tics or avoid triggering situations?

I don’t think I tried to avoid anything or make it better, but it was obvious that stress and a lack of sleep were the two main factors that shot my tics through the roof. My mom and I would be sitting at the dinner table some nights and she’d say, “I think you’re really tired today.” And that told me I was ticcing a lot. So I would try to sleep more.

Why did you decide to work in TV news if you knew that your tics would be visible on camera?

People ask me that a lot. In the medium of TV, your presentation is always top of mind. But I wasn’t going to let anything stop me from pursuing my passions. I’m glad I didn’t let worry get in the way of what has become a wonderful career.

I have a milder case of Tourette’s, so it seems like I have the ability “turn it off” for a small amount of time if I’m very focused. During a live report, for example. I have clips of myself that are recorded before the camera red light comes on (when you’re live on-air), and I’m just sitting there thinking and blinking rapidly. And then as soon as the red light comes on, I’m not blinking out of control anymore. But as soon as the live shot is over, I have to “get my tics out.”

Breaking news can challenge my disorder due to stress, but it’s something I’ve learned to manage.

What happened when you told your employer about your diagnosis?

I was nervous to tell my news director I have Tourette’s because I worried he was going to think, “Can I trust you on live TV?” But he was so great about it. He said he trusts me as a journalist, and this diagnosis didn’t change that. It made me feel even more confident in the work I do and the people backing me. ■

To learn more about how Kelsey lives with Tourette syndrome, check out her full interview online at [NIH MedlinePlus Magazine!](#)

Tourette syndrome: What you need to know



Tics can look like single actions or combinations of movements. They can also be vocal sounds.

Tourette syndrome (TS) is a neurological (nervous system) disorder. It causes involuntary, repetitive, and sudden movements or vocal sounds called “tics.” TS is a [chronic condition](#), and symptoms can last into adulthood. But TS can change throughout a person’s life. Tics may become milder and less frequent as people grow older. However, the disorder does not get worse over time.

TS can affect how a person acts in social, educational, or work settings. This can make these situations difficult or stressful. But TS is not a measure of intelligence. It’s important to learn about TS even if you don’t have it or don’t know someone who has it.

No one knows what causes TS, but some research points to a change in the genes that control how the brain communicates with the rest of the body.

Tics may become milder and less frequent as people grow older. However, the disorder does not get worse over time.

What are tics?

Tics usually begin between the ages of 5 and 10. Motor tics (body movements) typically appear before vocal tics (making sounds). Tics can be short, simple actions or complex patterns of movements.

Motor tics might look like:

- Eye blinking or other eye movements
- Grimacing
- Shrugging
- Head or shoulder jerking
- Touching an object
- Jumping
- Bending
- Twisting

Vocal tics might sound like:

- Repetitive throat clearing
- Sniffing
- Barking
- Grunting
- Repeating words or phrases
- Using vulgar or offensive words or phrases



If a child has tics for at least one year before the age of 18, it may be worth asking a health care provider about Tourette syndrome.

It's important to remember that tics are involuntary, no matter their severity or type. Sometimes tension will build in a person to a point where they need to complete their tic just to stop the urge. Excitement, anxiety, stress, uncomfortable clothing, or hearing certain sounds (such as sniffing or throat clearing) are common triggers for tics. They are less likely to happen during calm, focused activities or in deep sleep.

[Less than 1% of children](#) in the United States are thought to have TS, but researchers predict about half of those cases are undiagnosed. If tics occur for at least a year and begin before the age of 18, it may be worth asking a health care provider about TS.

How is Tourette syndrome diagnosed?

Sometimes it can take a while to get a TS diagnosis. Parents and doctors may not recognize tics as signs of TS. They may think they are temporary developmental behaviors or caused by another condition. The [Tourette Association of America](#) has resources to find a provider with TS-specific training and experience.

Primary care providers, pediatricians, and mental health specialists can all diagnose tic disorders. Generally, they will ask:

- How long the patient has had tics
- How frequently they experience tics
- Whether the tics are brought on by any medications, substances, or other health conditions



TS can affect how a person acts in social, educational, or work settings. This can make these situations difficult or stressful. But TS is not a measure of intelligence.

In rare cases, a health care provider may recommend an [imaging study](#). This is to rule out other conditions that may be causing the tics.

Can Tourette syndrome be treated?

It can, but treatment is not necessary unless a person's tics interfere with their everyday life. Many people can manage their tics more easily in adulthood. If tics do interfere with daily life, a health care provider may prescribe medication or behavioral therapy. Psychotherapy can also help people cope with TS or the effects of co-occurring conditions.

There is currently no cure for TS.

What conditions can co-occur with Tourette syndrome?

A co-occurring disorder is when someone has two or more disorders or illnesses at the same time. About 83% of children diagnosed with TS also have at least one of the following conditions:

- Anxiety
- Attention-deficit/hyperactivity disorder (ADHD)
- Behavioral problems
- Learning disabilities
- Obsessive-compulsive disorder (OCD)
- Developmental delays
- Autism spectrum disorder (ASD)
- Depression
- Speech or language problems

While TS is not an intellectual disability, it's still important for students living with TS to have the support they need in school. This could mean tutoring, smaller class sizes, or having private spaces to take exams or study. Adults with TS may also need accommodation at work.

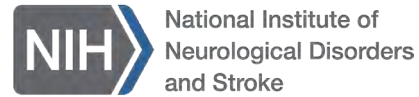
How can I support someone with Tourette syndrome?

NIH has more [information](#) about TS, and there are [resources to help](#) those living with TS talk about their condition with friends and family, teachers, coworkers, medical professionals, and even law enforcement. [Bullying](#) is a major problem for people with TS, especially children. Anyone can be an [advocate](#) and stand up for those with TS. So [be more than a bystander](#) when you see bullying.

If you have TS, think about joining an [NIH clinical trial](#). This research helps doctors better understand and treat the condition. NIH has [more resources](#) to help. ■



Meet the Director:



Walter J. Koroshetz, M.D.

Walter J. Koroshetz, M.D., has been fascinated by the brain and how it works from a young age. This curiosity, sparked by a chance encounter with a book on psychiatry, inspired a successful career in neurology and neuroscience. Now he leads the National Institute of Neurological Disorders and Stroke (NINDS), a driving force behind brain research in the United States. Dr. Koroshetz spoke with NIH MedlinePlus Magazine about his passion for the brain, his path to NINDS, and how The [Brain Research Through Advancing Innovative Neurotechnologies®](#) Initiative, or The BRAIN Initiative®, is transforming how we understand the brain.

Tell us about your background and why you decided to study the brain.

I grew up in Brooklyn, New York, and became interested in the brain in eighth or ninth grade. I was curious about why people are so different. I went to the library one rainy day and picked up the biggest book I could see, which was a book on psychiatry. The first chapter was about how cells in the brain communicate through the movement of ions across the membranes that enclose nerve cells. This aspect of biology fascinated me, and I spent years working in membrane biology labs.

Also, my dad got very sick with [Guillain-Barré syndrome](#) (a rare and serious condition that affects the nerves causing paralysis). He was in the hospital for about six months. Luckily, he made it out. I'm sure that also had something to do with my interest in the brain and nervous system.

You joined NINDS in 2007. How did you get here?

It was very serendipitous. I had been a neurologist and neuroscientist at the Massachusetts General Hospital (MGH) in Boston for 27 years. I was at a point in my career where I was being considered for chair of departments and was offered a couple of positions. I spoke with a friend and colleague who had left MGH to become a chair at another university. It turns out his wife was Dr. Story Landis, who was the Director of NINDS at the time. My friend said, "I have a better job for you!" And that was true. I came on as a Deputy Director at NINDS with Dr. Landis, and I'm glad I did. It wasn't planned, it just happened. (*Editor's note: Dr. Koroshetz became NINDS Director when Dr. Landis retired in 2014.*)

The brain is a unique organ. It is both functional (it controls motor skills, breathing, and other bodily processes) and psychological (it's responsible for our intellect, memory, personality, and mood). What's something you wish more people understood about the brain?

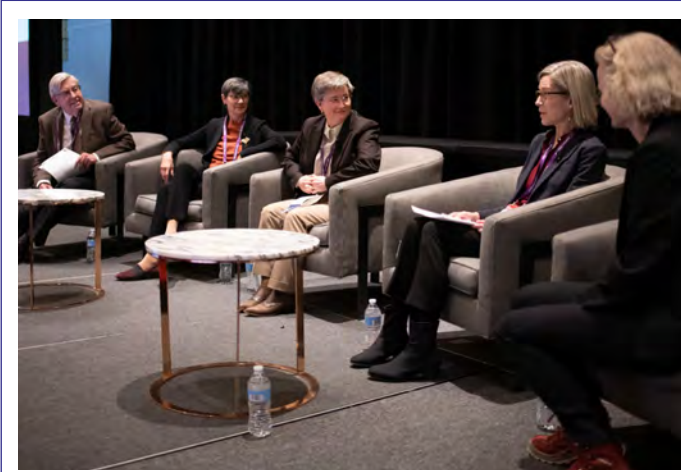
There is nothing that we do or experience that doesn't involve our brain. If the brain is not working, behaviors are not going to be normal. Sometimes we are quick to blame the dysfunctional behavior on the person when there is a brain disorder. This can create a great deal of stigma and hinder needed treatment.

There are a lot of disorders where the brain circuits are severely affected. It's important to understand that these are all disorders whether you can see something under a microscope or not.

How does NINDS collaborate with other institutes that deal with the brain, such as the National Institute of Mental Health (NIMH), and what sets NINDS apart?

Neuroscience itself is a huge area of focus here at NIH, and it's funded by different institutes. The [National Institute on Aging](#) researches Alzheimer's disease, and NINDS works with them on that and other neurodegenerative diseases. We also work with the [National Institute on Drug Abuse](#) (NIDA). Drugs such as opioids change the circuits in the brain, so addiction is really a brain problem, too. We closely collaborate with NIDA on the [Helping to End Addiction Long-term® Initiative](#), or NIH HEAL Initiative®. We focus on pain, and they work on addiction.

“There is nothing that we do or experience that doesn't involve our brain. If the brain is not working, behaviors are not going to be normal. Sometimes we are quick to blame the dysfunctional behavior on the person when there is a brain disorder.”



Dr. Koroshetz (far left) joins other NIH institute directors at the 5th Annual HEAL Initiative Scientific Meeting.

Neurologists think of mental health as neurological disorder without a known cause. These are all brain disorders, but in neurology, we tend to focus on the pathology inside the brain—something you can see under a microscope. However, even in those cases the patient is always suffering from a dysfunctional circuit. In psychiatry, it's been hard to identify the circuit trouble because there's nothing to see in the brain—it's not anything you can look at under a microscope.

The problems you see in people who have neurological, mental, and substance misuse disorders happen because something is interrupting the circuit's development or function. That's why the BRAIN Initiative is so important. It's run by multiple institutes but primarily NINDS and NIMH, and it's focused on understanding how to map, monitor, and modulate (change or alter) circuits in the brain. The BRAIN Initiative is really merging the fields of neurology and psychiatry.

The BRAIN Initiative is now in its 11th year, and you've been at NINDS since it started. What would you say are some of the most important findings or discoveries from that initiative?

The BRAIN Initiative was a great idea when the White House first announced it in 2013, but it has really defied all expectations. There have been so many amazing advances.

The biggest breakthrough was being able to [barcode and sequence](#) the [RNA](#) of individual brain cells. This allowed scientists to identify and categorize different types of cells very quickly and efficiently, which made it possible to create a [library of all](#)

[different cell types](#) in animal and human brains. (A cell *type* is a way of categorizing the cell based on its specific features and functions in the body.)

Next, BRAIN Initiative researchers began analyzing brain tissue of deceased individuals to find unique patterns of gene expression (how genes are turned on and off) in different cell types. This is an unbelievable advancement and is being used now to study a host of brain diseases.

Once you know a cell's *type*, you can look for changes in its current *state*. These snapshots tell us how the cell is functioning at a point in time, which can help us find changes associated with a specific disease. For example, by looking at a population of dopamine neurons in the brain of someone with [Parkinson's disease](#), scientists can observe a range of states, or health statuses. You might see some that just died, some that are stressed or dysfunctional and may die soon, and others that are healthy and functional. Being able to see this all at once is a powerful tool for uncovering what's causing these cells to die.

Next, it turns out that you can also identify parts of the genome called “promoters” or “enhancers,” which regulate when, where, and how much a certain gene is expressed. By attaching engineered genes to these promoters and enhancers, we can make changes in specific cell types in a precise manner. In mice, scientists use this method to turn nerve cells on or off (make them fire or stop firing) and change sick cells into healthy ones. The challenge is figuring out how to effectively deliver these treatments to the human brain. The BRAIN Initiative is working on that, too. Together, all of this is going to change how we treat brain diseases. ■

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To learn more about NINDS and how its using new technologies to study the brain, check out Dr. Koroshetz's full interview online at [NIH MedlinePlus Magazine!](#)



The BRAIN Initiative is an NIH-supported collaboration that aims to develop and apply new tools for understanding how the brain works. [Find out more about the BRAIN Initiative.](#)

“The real credit goes to the patients I've been privileged to care for throughout my career and the participants who were involved in the research. They're the ones really doing the work, and they deserve the credit.”

4 discoveries beyond the brain

NIH research explores early signs of brain disorders



Scientists developed a simple skin biopsy that could identify people with certain disorders, including Parkinson's disease.

Neurodegenerative diseases—such as [Alzheimer's disease](#), [Parkinson's disease](#) (PD), [Lewy body dementia](#) (LBD), and [amyotrophic lateral sclerosis](#) (also known as ALS or Lou Gehrig's disease)—affect millions of people around the world. These conditions progressively damage nerve cells in the brain and nervous system. Over time, this can lead to problems with movement, thinking, memory, and more.

A century ago, many [neurological conditions](#) could only be diagnosed through an autopsy (after the person had died). Fortunately, today's doctors and scientists have more ways to examine the brains and nervous systems of living patients. But these disorders can still be challenging to detect. Current diagnostic tools often identify these diseases after they have already started to damage the brain.

The National Institute of Neurological Disorders and Stroke (NINDS) leads research to help better understand, diagnose, and treat these conditions. Here are four recent discoveries that may help

doctors and scientists spot early signs of damage, develop and test new treatments, and figure out who might benefit most from specific therapies.

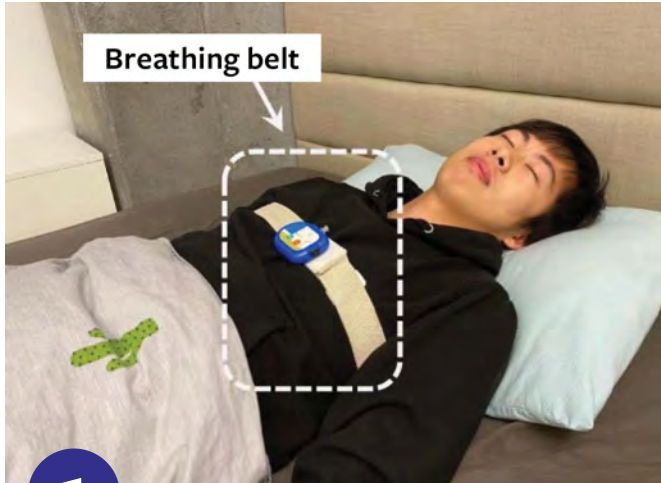
Heart imaging reveals early signs

NINDS researchers at the NIH Clinical Center used a new method to [identify early signs of PD and LBD](#). This team used a special type of PET scan to look at the hearts of people at high risk for these diseases. They found that people who later developed PD or LBD had levels of a chemical called norepinephrine in their hearts that were much lower than is typical, years before they showed any symptoms.

These findings suggest that PD or LBD might start in the part of the nervous system that controls automatic body functions (like heart rate and blood pressure) even before they affect the brain. Being able to spot these early signs could change how doctors understand and treat these diseases.

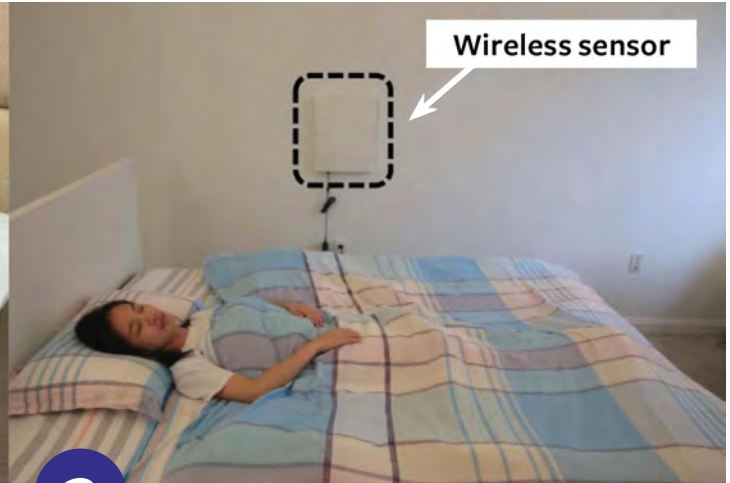


The National Institute of Neurological Disorders and Stroke leads research to help better understand, diagnose, and treat these conditions.



1

A participant wearing a chest belt during a sleep study to measure breathing patterns.



2

A wireless sensor uses radio signals to monitor breathing patterns without physical contact during sleep.

Blood tests for mitochondrial damage

NIH-funded researchers are developing a blood test that [measures the level of damage to the DNA inside mitochondria](#)—the cell’s energy producers. Previous research suggests that mitochondrial damage may be linked to some cases of PD, so focusing on this damage may help identify and diagnose PD early on. In this study, blood samples from people with PD showed more cell damage compared to samples from healthy volunteers. Some people with PD also had more damage than others.

Researchers still need to show that the test works in larger and more diverse populations. If successful, the test could help identify treatments that target mitochondria, learn which patients are most likely to respond to certain treatments, and determine whether a treatment is working.

Artificial intelligence analyzes sleep breathing patterns

In another innovative study, NINDS-funded researchers used an artificial intelligence (AI) program to [identify PD by analyzing breathing patterns during sleep](#). The researchers tested the AI program using two types of sleep data: breathing patterns and brain activity. By looking at 12 nights of sleep

test data from people with and without PD, the program was able to identify those with PD with a high degree of accuracy. It also detected small changes in PD symptoms over a longer period of time more accurately than traditional clinical assessments.

This program could help both doctors and researchers. By using this tool, doctors may find PD earlier, and researchers may develop new treatments easier and faster. However, researchers need to test it with more people from diverse backgrounds first. They also think it could be especially helpful for people who live in remote areas or have trouble leaving home.

Skin biopsy for neurodegenerative diseases

NIH-funded researchers developed a [simple skin biopsy](#) that may identify people with PD, LBD, and related disorders. This quick, nearly painless test looks for phosphorylated alpha-synuclein, a specific protein that’s associated with certain neurodegenerative diseases.

In this study, researchers looked at small skin samples from people diagnosed with one of these conditions and people without any history of neurodegenerative diseases. The test found this protein in more than 90% of people with a diagnosis compared to only 3% of individuals without one. This could lead to faster, more accurate diagnoses and earlier treatments for patients. ■



NIH-funded researchers are developing a blood test that measures the level of damage to the DNA inside mitochondria—the cell’s energy producers.

Parkinson's disease explained

What you need to know about this movement disorder



Most people first start experiencing symptoms around age 70.

Parkinson's disease (PD) is a progressive movement disorder of the nervous system. PD is one of the most common nervous system disorders, especially among older adults. It's estimated to affect between 500,000 and 1 million Americans.

Early signs of PD such as a slight hand tremor are often subtle, and symptoms gradually worsen over time. The condition can eventually disrupt balance, making walking and talking difficult. It can also cause serious changes to emotions, cognition (thinking), and sleep patterns.

There's no cure, but there are treatments that can help manage symptoms.

Who gets Parkinson's disease?

Anyone can develop [Parkinson's disease](#), but men are slightly more likely to develop it than women.

If you have a close family member with PD, your chances of developing it are higher. While some cases are linked to specific genetic mutations, not all cases are.

Most people first start experiencing symptoms around 70 years old, and the chances of developing it increases with age. But for a small number of people, PD can start sooner, before age 50.

What causes it?

Parkinson's disease happens when nerve cells in specific parts of the brain, particularly in an area of the brain called the [substantia nigra](#), break down and die over time. Many of the cells in this part of the brain are responsible for producing the chemical dopamine, which helps control motor function (movement). When these cells break down, dopamine levels drop, leading to problems with movement.

Scientists don't know exactly what causes these nerve cells to die, but it likely comes from a combination of [genetic changes](#) and environmental influence (such as exposure to air pollution, certain [pesticides](#), and other chemicals).

What are the symptoms?

Parkinson's disease has motor and non-motor symptoms.

Some common motor symptoms include:



Resting tremor or shakiness, especially in a hand, a foot, or the jaw



Bradykinesia (slowed movement)



Trouble with speech, balance, and coordination

Early on, someone with PD may notice a slight tremble in their hand or foot. Simple movements like buttoning a shirt can become difficult and take much longer. As the disease progresses, they often develop a distinct, shuffling walk with shorter steps. They may move more slowly, lean forward, and have trouble swinging their arms as they walk. Their face may appear expressionless or have a "masked" appearance (due to decreased blinking and other facial movements).

Non-motor symptoms are also common and may appear years before movement issues. They include:

- Depression, anxiety, and emotional changes
- A poor or lost sense of smell
- Constipation and bladder problems
- Sleep disorders such as sleep-talking and acting out vivid dreams

As the disease progresses, it may cause symptoms such as trouble swallowing, chewing, or speaking, as well as cognitive impairment (problems with thinking) or even [dementia](#).



SOURCE: [AMERICAN PARKINSON DISEASE ASSOCIATION](#)

FAST FACT

Parkinson's disease (PD) is named after James Parkinson, the British doctor who described the condition and its symptoms in an essay titled "An Essay on the Shaking Palsy," published in 1817. While others had written about some of the symptoms before, Dr. Parkinson brought them all together and established PD as a recognized medical condition.

How is it diagnosed?

There's no single test for Parkinson's disease. Doctors usually diagnose it based on medical history and a neurological examination.

During the exam, the doctor will look for symptoms like tremor, muscle stiffness, slow movements, and problems with balance and walking. They may also do testing to rule out other disorders with similar symptoms. These tests may include blood and lab tests, as well as brain imaging scans.

If symptoms improve after taking medication, this can help confirm the diagnosis.

How is it treated?

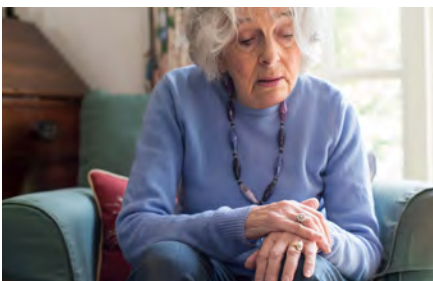
There isn't a cure yet. But there are treatments available to help relieve symptoms, especially in the earlier stages.

- **Medications.** Levodopa is a common medication for PD. It helps control motor symptoms by replenishing dopamine levels in the brain. [This medication](#) is usually combined with another medication to reduce side effects. Other medications can help treat tremor, rigidity, and non-motor symptoms like depression.
- **Deep brain stimulation (DBS).** In severe cases where medications aren't working well enough, doctors may recommend [DBS](#) to ease symptoms. Electrodes implanted in the brain send electrical pulses to the parts of the brain that control movement. This can help reduce movement-related symptoms and improve motor function.
- **Lifestyle and complementary therapies.** A healthy diet, exercise, and therapies like tai chi or dance [can help manage](#) symptoms and improve overall well-being.

Most treatments focus on improving the primary movement symptoms. But some medications and therapies can also improve problems with sleep, constipation, and cognition.

Living with Parkinson's disease

Parkinson's disease is a chronic, progressive condition, and there is no way to predict how quickly or severely the disease will develop for any one person. While some people experience mild motor disruptions, others become more severely disabled. But the good news is that many people can live active and fulfilling lives for many years after diagnosis.



Parkinson's disease is a chronic, progressive condition, and there is no way to predict how quickly or severely the disease will develop for any one person.



By the numbers

Between **500,000 and 1 million** people in the United States are estimated to be living with Parkinson's disease (PD).

PD is more common in **older adults** as the risk of developing it increases with age. The average age of onset is around **70 years old**.

Although rare, some people develop PD as young as **age 50**. This is known as "**early onset**" PD.

PD affects **more men** than women.

About **15% to 25%** of people with PD have a **family member** who also has the disease. Having one or more close relative with PD increases your risk of developing it.

SOURCE: NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE

Research, resources, and support

The [National Institute of Neurological Disorders and Stroke](#) (NINDS) supports PD research at NIH and across the country. Current NINDS-funded research programs are studying how the disease develops and progresses and are working to develop new medications that can delay, prevent, or even reverse it.

If you or a loved one is dealing with PD, you can:

- [Learn more about the research](#) that's happening
- Help with research and improve care for those with PD by [getting involved in a clinical trial](#)
- [Find organizations](#) that offer resources and support ■

A quick guide to understanding tremor

It's more than just an occasional shaky hand

Tremor can occur in any part of the body and becomes a problem when it interferes with daily activities.

Sometimes it can be a symptom of underlying neurological disorders.

What is tremor?

Tremor is an unintentional, recurring muscle contraction that causes shaking movements in one or more parts of the body. Tremor can happen all the time or only sometimes. It can occur during movement, such as writing or reaching for something (action tremor), or while someone is relaxed and sitting or lying down (rest tremor).

It's important to know that not all tremors are abnormal. Everyone has a tiny bit of shaking in their body, called "physiologic tremor." This tiny, barely noticeable shakiness is a result of normal processes in the body such as heartbeat and muscle activity. This type of tremor is usually so small that you can't see it, and it doesn't get in the way of everyday activities.

However, when shaking becomes more noticeable or makes daily tasks difficult, it might be an abnormal tremor.

What causes tremor?

Abnormal tremor is a type of movement disorder that occurs when there's a disruption in parts of the brain that control movement. Tremor can be a primary condition, meaning it is a medical problem on its own, or a symptom of another condition like [Parkinson's disease](#), [stroke](#), or [multiple sclerosis](#). It can also be a reaction to something external, such as certain medicines or substances.

Sometimes tremor runs in families, which suggests that genetics could play a role. However, the exact cause is often unknown.



Tremor that occurs during movement is called an "action tremor."

What are the symptoms?

Tremor can look like:

- Shaking or trembling (especially in the hands, but it can also be in the arms, head, legs, or trunk)
- A shaky or quivering voice
- Difficulty with fine motor tasks (such as writing, drawing, or using utensils)

These symptoms may worsen with stress, tiredness, strong emotions, or caffeine consumption. Certain tremors can be triggered by specific postures or tasks.

What are the different kinds of tremor?

Tremors are categorized by when they happen and what triggers them.

- **Physiologic tremor.** The normal, tiny amount of tremor that's present in all healthy individuals.
- **Enhanced physiologic tremor.** A more noticeable version of physiologic tremor. This small, fine tremor in the hands and fingers is usually a side effect of certain medications, alcohol withdrawal, stress, fatigue, or some medical conditions.
- **Essential tremor.** The most common type of abnormal tremor. It happens without other neurological symptoms. It occurs during movement and usually affects the hands and arms, but it can also impact the head, legs, or voice. This type often runs in families.
- **Parkinsonian tremor.** A common early sign of Parkinson's disease (though not everyone with the condition experiences tremor). It is most noticeable when the body is at rest and may look like rolling a pill between the thumb and a finger. This type usually happens in only one limb or on one side of the body at first, but it can eventually show up on both sides.
- **Dystonic tremor.** A tremor that occurs in people with [dystonia](#), a condition that makes muscles contract involuntarily. It can affect the neck, vocal cords, or limbs.
- **Cerebellar tremor.** A slow, large tremor that gets worse after purposeful movement (like pressing a button). It's caused by damage to the cerebellum, the part of the brain that controls movement. This damage could be caused by a stroke, tumor, injury, or [alcohol use disorder](#).

How is tremor diagnosed?

If you're experiencing tremor, it's important to speak with a health care provider. They will likely:

- Ask about your medical history and your symptoms
- Perform a physical exam
- Conduct a neurological exam

They may also order bloodwork or brain imaging to identify for any underlying causes.

What's the treatment?

Most tremors can't be cured, but they can be managed. Treatment depends on the type of tremor and its severity. If tremor is caused by a different health condition, treating that condition can reduce or stop the tremor. Mild cases may not need treatment, especially if you aren't bothered by the symptoms.

- **Medication.** Certain medications can help slow or suppress symptoms. [Botulinum toxin](#) injections can also help certain kinds of tremor.
- **Surgery.** For severe cases of tremor and when medicines aren't helping, a doctor may recommend surgical treatment such as [deep brain stimulation](#).
- **Therapy.** Physical, speech, and occupational therapy can all help control symptoms of tremor and manage daily tasks.
- **Assistive devices.** Certain [assistive tools and technologies](#) can help simplify daily tasks such as eating, writing, or using a computer. Some wearable devices can also help suppress tremor.



Remember, if you're concerned about tremor, talk to your health care provider.

Living with tremor

Making [certain lifestyle changes](#) can help manage mild to moderate tremor.

- Choose easy-to-wear clothes and shoes, such as those with Velcro or slip-ons.
- Reduce or eliminate caffeine and other stimulants.
- Talk with your doctor about trying medications to suppress your tremors or stopping medications that might worsen them.
- If your doctor prescribes medications to help your tremors, take them on time.
- Reduce stress and get enough sleep.

Remember, if you're concerned about tremor, talk to your health care provider. They can help you find the best ways to manage your symptoms and improve your quality of life. ■



FAST FACT

Essential tremor is one of the most common movement disorders. It often begins during adolescence or in middle age (40–50 years old), and **50% to 70% of cases** are inherited (run in families).

SOURCE: [NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE](#)

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