Module 1968

# Parkinson's disease: Cause, symptoms and diagnosis

From this CPD module you will learn:

- What causes Parkinson's Disease
- About the symptoms of Parkinson's disease
- How Parkinson's disease is diagnosed
- What advice to give to someone who has been newly diagnosed with Parkinson's disease

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Parkinson's disease is a chronic, progressive neurological disease in which parts of the brain become damaged, preventing the ability to control movement properly.

## What causes Parkinson's disease?

In Parkinson's disease, the neurons (nerve cells) that produce dopamine are destroyed or damaged. This primarily happens in the part of the brain called the substantia nigra, located within the basal ganglia.[1] Dopamine is a chemical messenger that transmits signals in the brain from one neuron to another, producing smooth, purposeful movement. Dopamine is also involved with memory, behaviour, sleep and mood. When the neurons die, communication between the brain and muscles weaken and eventually the brain cannot control muscle movement.[2]

Symptoms of Parkinson's disease usually appear when between 30-50% of the nerve cells in the substantia nigra have been lost.[1] The ongoing fall in dopamine production accounts for the degenerative course of the condition.

## How common is Parkinson's disease?

The charity Parkinson's UK investigated the number of people affected by Parkinson's disease. They estimated in 2018 that the condition affected over 145,000 people over 20 years old in the UK and around 18,000 new cases were identified in people over 45 years old. A lifetime risk of being diagnosed with Parkinson's disease in the UK in 2015 was around of 2.7%, or one in every 37 people.[3]

## What are the risk factors?

It is not fully understood why neuron destruction occurs. However, a combination of factors may be responsible or make it more likely to occur. These include:

- **Age:** Parkinson's disease is more common in older people; therefore, as the population increases in age, the incidence and prevalence will increase in the coming decades.[3] Most people with Parkinson's disease develop symptoms at 50 years of age or older. Those diagnosed under 50 years of age are referred to as young onset. A diagnosis under 20 years of age is rare and may be referred to as juvenile onset.[4]
- **Gender:** For people aged between 50-89 years, the prevalence of Parkinson's disease is 1.5 times higher in men than women.[3]
- **Genetics:** In most cases, Parkinson's disease is not inherited. However, around 10% of patients have a family history of the condition.[5] A number of genes have been identified as being linked to Parkinson's disease, although there is not one specific gene mutation responsible.[4] It is not fully understood how genetic changes cause Parkinson's disease and research to gain further understanding is ongoing.
- **Environmental:** Exposure to certain herbicides and insecticides have been linked to the development of Parkinson's disease.[5,6]

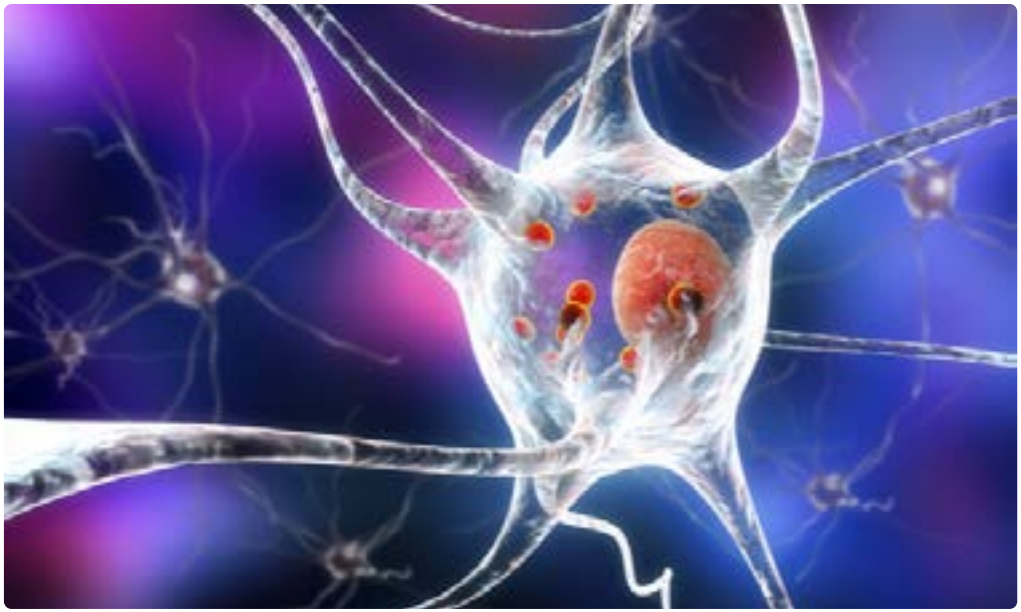
## Types of Parkinson's disease

Parkinsonism is an umbrella term given to conditions that feature Parkinson's-type symptoms. Approximately 85% of people with parkinsonism have Parkinson's disease, which is also referred to as idiopathic Parkinson's disease.[8] The other 15% are rarer conditions, some of which are described under the differential diagnosis section below.

Commonly, Parkinson's disease is divided into four main categories based on the time course of the disease: diagnosis, maintenance, complex and palliative. However, it is important to note that not all patients will go through all four stages, so therapy and treatment needs to be assessed on an individual basis.[9]

## What are the symptoms?

Parkinson's disease is often viewed as a movement disorder, with motor symptoms being the most noticeable. However, non-motor symptoms can also have a significant impact on a patient's life. The progression of symptoms is different for everyone, and not everyone will experience all symptoms.



In Parkinson's disease, the neurons that produce dopamine are destroyed or damaged in the substantia nigra

### Motor symptoms

The three main motor symptoms of Parkinson's disease are bradykinesia, rigidity and tremor. Often motor symptoms start unilaterally and progress bilaterally in later disease. Symptoms can also fluctuate on a daily basis, with 'good' and 'bad' days. It should be noted that the side effects of some Parkinson's treatments produce movements that are often incorrectly perceived as being symptoms of the disease itself, eg dyskinesia.[10]

- **Bradykinesia:** Slowness of movement - this causes difficulties with rapidly repeated movements.[10]
- **Rigidity:** Stiff and inflexible muscles are common in Parkinson's. It can cause a patient to have 'fixed' facial expressions and lose the ability to swing their arms as they walk.[10]
- **Tremor:** An uncontrollable 'shaking' movement that commonly starts in a hand before 'spreading' and getting worse over time. A resting tremor can happen when the body is still and relaxed, for example a 'pill-rolling' rest tremor looks like the person is trying to roll a pill between their thumb and index finger. An action tremor happens when the patient is trying to do something such as drink from a cup.[10]
- **Start hesitation or freezing:** Start hesitation occurs at the start of an action, such as speaking or walking. Freezing is when a person stops suddenly without intending to do so. Both can last a few seconds or minutes. Freezing can contribute to postural instability.[10]
- **Postural Instability:** As Parkinson's disease progresses, balance and posture are also affected. The ability to control movement and adjust balance when moving is reduced, and when combined with slower reflexes, causes patients to lose balance and fall. Often patients find that their posture and pattern of walking (gait) changes, becoming more stooped and having short, shuffling steps.[10]

Tremor - uncontrollable shaking - is one of the three main motor symptoms of Parkinson's disease

- **Dystonia:** A person's muscles contract or cramp uncontrollably.[10]

### Non-motor symptoms

Non-motor symptoms are those which do not affect movement and include both physical and mental health issues:[10]

- **Pain**: Musculoskeletal pain is commonly experienced in Parkinson's disease.
- **Hypotension:** Low blood pressure can be problematic, particularly postural hypotension, which can also contribute to falls.
- **Continence problems:** Urinary frequency/urgency, delayed sphincter response when attempting to use the toilet or nocturia can be challenging. Muscle rigidity, lack of exercise, medication and difficulty drinking can contribute to constipation.
- **Eye problems:** Difficulty starting to move eyes, moving them quickly or double vision can be due to poor co-ordination and fatigue.
- **Sleep problems:** Patients can experience a range of sleep conditions. Insomnia may be linked to tremor, difficulty turning due to rigidity, pain, nocturia or excessive daytime sleepiness due to medications.
- **Fatigue:** This is a feeling of exhaustion and should not be confused with tiredness; fatigue does not improve with rest.
- **Mental health issues:** Parkinson's can impact almost every aspect of life, and so depression, anxiety, apathy and irritability are common issues. Sometimes this may be linked to medication 'wearing off'.
- **Memory and dementia:** Mild memory and thinking problems can arise in patients with Parkinson's without dementia. This may include struggling with planning and multitasking. Dementia is common, with an estimated 50-80% of those with Parkinson's developing the condition, with an average onset of Parkinson's to dementia development of approximately 10 years. The two types of dementia that people are likely to have are 'Parkinson's dementia' and 'dementia with Lewy bodies'.

## Diagnosis

Accurate diagnosis of Parkinson's underpins the management of the disease. However, diagnosis is based on clinical symptoms, which are open to subjectivity and error. There is no definitive scan or test available; however, the UK Parkinson's Disease Society Brain Bank Clinical Diagnostic Criteria should be consulted.[11] The diagnosis should made by a specialist in movement disorders and reviewed every 6-12 months as symptoms progress from the early to late stages of the disease. This is particularly important if the patient develops any atypical clinical features.[11]

A Parkinson's disease diagnosis can be established at post-mortem, with patients donating tissues to a brain bank for diagnostic confirmation and research.[11]

## Differential diagnosis

There are a number of conditions that mimic symptoms of Parkinson's disease:

- **Essential tremor:** Also known as an 'action tremor' and is pronounced when the hands are performing an action such as holding a cup. Conversely, a tremor is Parkinson's disease tends to show initially during rest. The cause of essential tremor is unknown, although it may have a hereditary component with other family members often affected. An essential tremor is not the same as a tremor which might occur when a person is nervous or stressed.[12,13]
- **Multiple System Atrophy (MSA):** A neurological condition that causes overproduction of a protein called alpha-synuclein, which causes atrophy of nerve cells in several areas of the brain. MSA generally progresses faster than Parkinson's disease and responds poorly to Parkinson's disease drugs.[13]
- **Vascular (arteriosclerotic) parkinsonism:** This condition is linked a restriction of blood supply to the area of the brain that controls movement. Patients may have one or more small strokes

(transient ischaemic attack), which may make the disease progressively worse. Symptoms tend to be bilateral, symmetrical, affect lower limbs and tremor is rare.[13]

- **Drug-induced parkinsonism:** Certain medications, which act on dopamine receptors, can cause side effects similar to the symptoms of Parkinson's disease. These include anti-emetics, selective serotonin reuptake inhibitors, calcium channel blockers and antiepileptic drugs.[13,14]
- **Progressive supranuclear palsy (PSP):** Caused by tau protein clumps in certain brain cells and presents with walking difficulties and visual symptoms. Motor symptoms tend to be symmetrical and posture tends to be upright with the head pulled backwards unlike the stooped posture of Parkinson's disease.[13]

## What advice can pharmacists give patients after diagnosis?

Immediately after diagnosis, a patient may seek further information from their pharmacist.

- **Support groups:** Connecting with other people affected by Parkinson's disease may help them understand the condition and what to expect. The Parkinson's UK website at ***tinyurl.com/parkinsonsmod*** has a list of support groups that are searchable by postcode. This charity also has a helpline that offers free confidential support.
- **Further sources of information:** Provide patients and their carers with written information about the disease.
- **Driving:** When diagnosed, a patient must inform the DVLA/DVA and their car insurance company.[15] People can continue to drive so long as symptoms/side effects do not affect their ability to control the car. Some people may be required to have a medical or driving assessment. Patients who suffer from daytime sleepiness and/or sudden onset of sleep should not drive.[11]
- **Exercise:** Exercise can potentially slow the progression of symptoms, if they are able, encourage someone who is newly diagnosed to perform vigorous exercise like running, gym sessions and cycling.[16]
- **Future proofing their home:** The addition of a downstairs bathroom with a raised toilet seat or rails for the bath/shower may all prevent falls in the future. A height-adjustable bed and electric seats can help with independence. Recommend removing or firmly securing loose rugs that could become a tripping hazard and rearranging furniture to make it easier to move around at home.[17]
- **Clothing:** Buttons may be difficult. Therefore, tell patients to consider Velcro to secure clothes instead. Elastic waistbands on trousers are also helpful.
- **Sleep:** Give advice that aims to prevent sleep problems becoming an issue. This can include good sleep hygiene tips such as keeping the bedroom dark and cool, limiting daytime naps, avoiding stimulants such as caffeine before bedtime and establishing a relaxing bedtime routine by limiting screen-time just before bed.[10]

# Take the 5-minute test online

1. Women aged 60-89 years are more likely to have Parkinson's Disease than men in the same age group.
   **True or false**
2. Loss of dopamine causes symptoms such as loss of memory, problems sleeping, balance problems and mental health issues such as depression and anxiety.
   **True or false**
3. 3) The three main motor symptoms are bradykinesia, rigidity and tremor. True
4. Non-motor symptoms of Parkinson's disease include anuria, hypertension and pain.
   **True or false**
5. It is possible to cure Parkinson's disease.
   **True or false**
6. It is potentially possible to slow down Parkinson's disease with rigorous exercise, rather than being sedentary.
   **True or false**
7. When diagnosed, a patient must inform the DVLA/DVA and their car insurance company.
   **True or false**
8. Drugs such as some selective serotonin reuptake inhibitors can mimic symptoms of Parkinson's disease.
   **True or false**
9. It is recommended to diagnose Parkinson's disease using an MRI scan.
   **True or false**
10. Once diagnosed with Parkinson's disease, patients should be reviewed monthly.
    **True or false**

## References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# Parkinson's disease: Cause, symptoms and diagnosis

**What are you planning to learn?**

I am planning to learn about Parkinson's disease; the prevalence, diagnosis, the extensive symptoms and practical management techniques to aid with daily living so that I am able to guide my patients who are suffering with this condition. As we have an increasing ageing population and life expectancy, there will be more patients suffering with Parkinson's disease and for longer periods of time, so it is crucial that I learn more about this condition.

**How are you planning to learn it?**

- I plan to read the National Institute for health and Care Excellence guidance available on Parkinson's disease in adults at ***tinyurl.com/parkinsonsmod1***
- I plan learn about the motor and non-motor symptoms of Parkinson's disease at ***tinyurl.com/parkinsonsmod2***
- I plan to learn about practical home advice for people living with Parkinson's disease at ***tinyurl.com/parkinsonsmod3***
- I also plan to complete the five-minute test at ***www.chemistanddruggist.co.uk/update-plus*** to test my knowledge and confirm what I have learned.

**Give an example of how this learning has benefited the people using your services**

After learning more about Parkinson's disease, I feel able to refer, signpost and counsel patients on managing their condition. Learning about the extensive motor and non-motor symptoms that can occur in the condition has made me appreciate how overwhelming the diagnosis can be for patients and how important it is that I make myself part of the support system that patients often lack. In the pharmacy, I make a point to ask all my patients how they are doing when they come to collect their medications.

Since carrying out this learning, I have been able to help patients with Parkinson's disease with some of the more practical things they can do to help with their daily activities, such as wearing clothes without buttons or suggesting modifications to their homes.