

Understanding Peripheral Neuropathy and Cancer

A guide for people affected by cancer

Peripheral neuropathy is a nerve condition that can happen with cancer, or with cancer treatment. We hope this fact sheet will help you, your family and friends understand more about peripheral neuropathy and how it can be managed.

What is peripheral neuropathy?

Peripheral neuropathy is damage to the peripheral nerves (see diagram right). These nerves carry information between the central nervous system (brain and spinal cord) and the rest of the body. Unlike many other cells in the body, nerve cells aren't easily repaired or replaced once they are badly damaged.

Cancer, or some cancer treatments, can cause peripheral neuropathy. It can also happen due to an accident or injury, infection or diabetes. The symptoms can vary, and depend on which type of peripheral nerves are affected (see page 3).

Peripheral neuropathy most often affects the hands or feet with feelings of numbness, pain or burning, a loss of sensation, tingling or "pins and needles". If the condition worsens, these symptoms may start to spread further up the arms and legs. Other symptoms may include muscle weakness, cramping, dizziness, balance issues, trouble sensing where your feet or hands are, ringing in the ears (tinnitus), hearing loss or constipation (see page 3 for more).

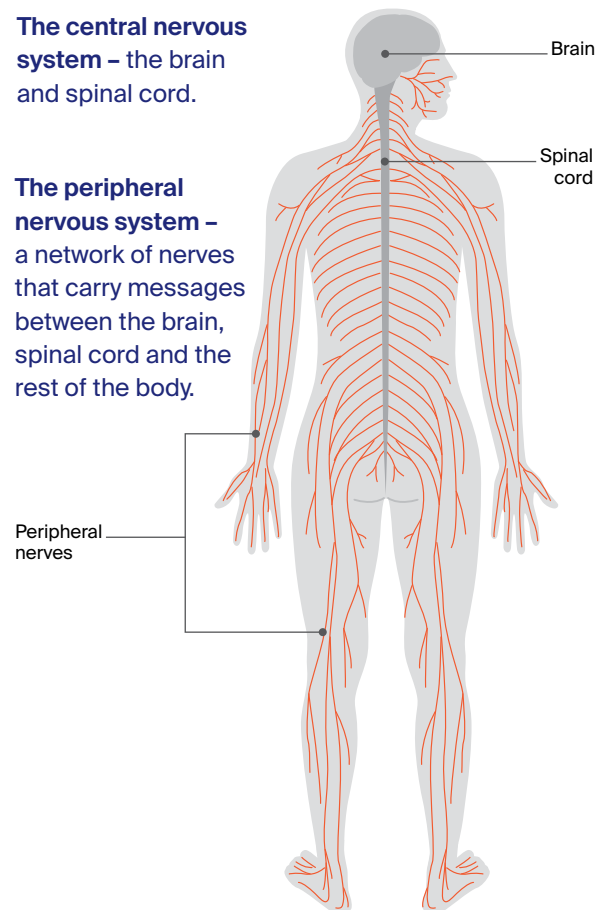
Symptoms range from mild to severe, appear during or after treatment and can be temporary or permanent (or last for months or years). The symptoms may be worse at night and disrupt sleep, and can greatly affect quality of life – but there are often ways to help manage changes (see page 5).

About the nervous system

The nervous system controls everything your body does. It has 2 main parts.

The central nervous system – the brain and spinal cord.

The peripheral nervous system – a network of nerves that carry messages between the brain, spinal cord and the rest of the body.



How nerves work

Nerves are made up of nerve cells called neurons. When a nerve ending in the body (for example, in the finger) is stimulated, a tiny electrical signal is sent through the neuron and nerve system to the spinal cord and brain. If a peripheral nerve is damaged, the electrical signals may be changed, blocked or mixed up, leading to a wide range of symptoms.

What causes peripheral neuropathy?

There are many causes of peripheral neuropathy. Some types of chemotherapy used to treat cancer may damage peripheral nerves. This side effect is called chemotherapy-induced peripheral neuropathy (CIPN). Sometimes, other treatments such as immunotherapy, or the cancer itself, are the cause.

Possible cancer-related causes of peripheral neuropathy include:

- certain chemotherapy drugs, in particular taxanes (e.g. docetaxel, paclitaxel), platinum drugs (e.g. carboplatin, cisplatin, oxaliplatin) and vinca alkaloids (e.g. vincristine)
- the use of immunotherapy drugs
- some other cancer drugs, such as thalidomide, bortezomib and brentuximab vedotin
- some types of cancer (e.g. lung cancer, myeloma and lymphoma)
- tumours pressing on nerves
- surgery or radiation therapy damaging nerves.

Diabetes, shingles, heavy use of alcohol and some drugs, and a lack of certain vitamins and minerals (especially vitamin D and some B vitamins) can also cause, or contribute to, your risk of peripheral neuropathy. Smoking may also increase your risk.

Will I get it if I have chemotherapy?

About 40% of people who have chemotherapy will have symptoms of peripheral neuropathy. But the risk varies with different chemotherapy drugs. In people treated with certain chemotherapy drugs (see above), the rate is higher, with about 70% of these people experiencing some symptoms a month after treatment, and about 30% still having symptoms 6 months after treatment finishes.

Will it get better?

Some types of chemotherapy cause short (acute) episodes of peripheral neuropathy during, or soon after, a cancer treatment session. These episodes tend to last a few days. For other types of chemotherapy, peripheral neuropathy may be longer-lasting (chronic). It may start during treatment and the risk increases the more treatment

cycles that you have. In some cases, peripheral neuropathy can develop or get worse over time, even after treatment has finished.

When cancer treatment ends, the peripheral neuropathy symptoms may begin to improve over 6–12 months. In some people, symptoms are permanent and may be mild to severe. This is more likely if you have had intensive treatment, such as a high-dose chemotherapy, or if you have diabetes or other risk factors for peripheral neuropathy.

Can it be prevented?

So far, no therapy has been proven to prevent peripheral neuropathy, although studies suggest that exercise may help (see page 5). Researchers are studying whether ice mitts and booties (gloves and socks) worn during chemotherapy could help, but there is not enough evidence yet to tell if this works.

It may help to be checked for any existing nerve damage before starting treatment, so that any changes can be checked against this baseline.

If you start having symptoms during chemotherapy treatment, your doctor may reduce the doses of chemotherapy drugs, or increase the time between treatment cycles. This sometimes allows the nerves to recover and prevents permanent damage.

Some people may need to stop having a particular chemotherapy drug. You can talk to your doctor about how they will balance the risk of changing the chemotherapy plan against the risk of the nerve damage becoming permanent.

If you have diabetes, it should be managed well and blood sugar levels monitored carefully, to lower your risk of peripheral neuropathy. Limiting the amount of alcohol you drink, staying a healthy weight and not smoking may also lower your risk. Talk to your treatment team about your individual risk factors, including medicines that may increase your risk.



Driving safely – Ask your doctor if it's safe to drive or operate machinery, especially if you do this for work. Depending on the symptoms, you may need a break from driving and your licence may be impacted.

Symptoms of peripheral neuropathy

Peripheral neuropathy is a complex condition that can cause many different symptoms. This is because the damage can happen to any part of the peripheral nervous system, which includes sensory nerves, motor nerves and the autonomic nervous system. Often, more than one type of nerve is affected. Symptoms may be mild in the beginning, but often get worse over time, or with more cancer treatment.

Type of nerve	What these nerves do	Symptoms of damage
sensory nerves	control sensation and feeling including pain, temperature, touch, vibration, and where the body is moving (important for balance and coordination)	<ul style="list-style-type: none"> • numbness – not being able to feel hands or feet • tingling or “pins and needles” in hands or feet • pain in hands or feet – this may be burning or shooting pain, “like walking on hot sand” • hypersensitivity – where light touch feels more intense or is painful (especially at night) • a reduced feeling of sensation or dulled feeling of touch • confusion about temperature (e.g. feeling heat as cold, or not being able to tell if something is hot or cold) • loss of awareness of where your body is in space, making you feel clumsy, especially when walking on uneven surfaces • trouble keeping your balance when walking • loss of hearing, or ringing in the ears (tinnitus)
motor nerves	control muscle movement	<ul style="list-style-type: none"> • finding it hard to do up buttons or pick up small objects • trouble walking up stairs or getting up out of a chair • muscle wasting or loss of muscle tone • weakness (e.g. not being able to open a jar) • cramps • muscles twitching under skin • poor handwriting • unsteady way of walking (gait)
autonomic nervous system	control blood pressure, heart rate, temperature and sweating, digestion, and bowel and bladder function	<ul style="list-style-type: none"> • constipation • feeling bloated, or feeling full earlier than usual when eating • diarrhoea • dizziness when changing position from lying down to sitting up, or from sitting to standing • changes to your vision, such as blurred vision • trouble getting or keeping an erection

“My symptoms included acute pain, numbness, and sharp pins and needles in my hands and feet. Exercise and daily tasks became more difficult. I often felt unstable when walking and was prone to falls. I started slowly building up my fitness. I gradually got back to my tennis and long walks. It was very frustrating, but I was encouraged by small, incremental improvements.” PHIL

Diagnosis

If you are having treatment that has a high risk of causing nerve damage, your treatment team will monitor you closely for early signs of peripheral neuropathy. Sometimes, peripheral neuropathy may be diagnosed after you tell your cancer specialist or general practitioner (GP) about your symptoms.

If your doctor suspects that you have peripheral neuropathy, they will check how the symptoms affect your daily life and may ask you to complete a symptom checklist. The doctor may also check your:

- **awareness of where your body is moving** – you close your eyes and answer questions about the position of parts of your body
- **strength** – you push against the doctor to check for weakness in your arms or legs
- **sensation** – your response to different types of sensations, including touch, temperature and sharp or blunt objects, will be checked
- **reflexes** – your ankles, knees and elbows are gently tapped with a small hammer to check their automatic movement
- **balance and coordination** – you may be asked to walk in a straight line or balance on one leg
- **blood pressure** – your blood pressure is measured when you are lying down and standing up to see if there is a difference.

In some cases, you may be referred to a neurologist (a specialist doctor who diagnoses and treats diseases of the nervous system). They may arrange a test called a nerve conduction study, to check how many cells are working and how quickly they send electrical signals along to the next cells.

Based on your symptoms and test results, your doctors may give the peripheral neuropathy a grade. This is usually a grade of 1 to 4, with grade 4 being the most severe and needing urgent attention.



It's important to tell your treatment team if you start having any symptoms of peripheral neuropathy or notice a change in your symptoms. Adjusting your cancer treatment may allow the nerves to recover and avoid permanent damage. Your team can also check if anything else is causing the symptoms.

Treatment

Currently there is no treatment that can reverse nerve damage. To stop chemotherapy-induced peripheral neuropathy from getting worse, your doctor may change how much or how often you have chemotherapy. In severe cases, chemotherapy may need to be stopped altogether. If peripheral neuropathy is caused by the cancer itself, symptoms may ease once the cancer has been treated. For some people, the damage may be permanent.

You may be worried about telling your treatment team that you have symptoms of peripheral neuropathy because you want to complete the cancer treatment. But not telling them could mean that you miss any chance to reverse the nerve damage and symptoms. If your doctor recommends pausing or stopping chemotherapy, they will talk to you about other ways to treat the cancer.

Medicines to manage symptoms

Doctors use various medicines to help relieve symptoms including:

- **pain medicines** – you can try over-the-counter pain medicines (e.g. paracetamol, ibuprofen) but these may not be helpful; your doctor may prescribe stronger pain medicines (e.g. tramadol), but the side effects may mean that these are not good long-term solutions
 - **duloxetine** – sometimes this antidepressant is recommended for managing peripheral neuropathy; while some studies have shown that it helps relieve numbness, tingling and pain, other studies have found no benefit
 - **other drugs** – because treatment options are limited, some other types of antidepressants, the anticonvulsant pregabalin, and the topical creams capsaicin or lignocaine are sometimes recommended by doctors to relieve symptoms such as pain, but how well they work is not clear
 - **laxatives or stool softeners** – these can help manage constipation.
- See our *Understanding Cancer Pain* booklet.

You may see a range of health professionals to help manage peripheral neuropathy symptoms, including a psychologist (or sometimes a pain specialist), exercise physiologist, occupational therapist, physiotherapist or podiatrist.

Ways to manage peripheral neuropathy

Try these tips to help relieve symptoms, reduce the risk of injury and adapt to life with peripheral neuropathy.



Exercising

Studies suggest that in people having chemotherapy, those who do some exercise have a lower risk of developing nerve damage. Gentle, regular exercise can also help reduce the symptoms of peripheral neuropathy pain. A daily gentle walk is a good starting point. Continuing to exercise after you finish treatment may also lower your risk of post-treatment peripheral neuropathy. A physiotherapist, exercise physiologist or occupational therapist can create a suitable exercise plan that's personalised for your situation.

► See our *Exercise for People Living with Cancer* booklet.

Avoiding falls



- Avoid slippers or shoes with thick soles that might make you trip
- Keep rooms well lit.
- Remove clutter and any loose rugs.
- Use a non-slip mat in the shower and bath.
- Place rails on stairs and in the bathroom.
- Talk to your doctor about a falls prevention program.

An occupational therapist suggests aids or equipment (e.g. special shoes) or strategies (e.g. using visual cues on uneven ground) to help you with daily tasks and to reduce your risk of falls. They may gradually introduce different textures to encourage normal use of your hands. A physiotherapist or exercise physiologist may help you to improve your strength and balance, and may also suggest walking aids.

Caring for hands and feet



- Moisturise and keep nails trimmed.
- Keep hands and feet warm.
- Wear gloves when washing the dishes or gardening.
- Use heatproof potholders when cooking.
- Test water temperature with your elbow.
- Make sure your shoes fit well.
- Untuck sheets and bedcovers. Try silk or bamboo sheets if your feet are sensitive or use a special frame to keep sheets off your feet.
- Some people find magnesium (in a cream or tablet) eases muscle cramps in the feet and legs.

A podiatrist can trim your toenails, treat any skin problems (e.g. blisters and corns), and check your feet for signs of any injuries that you may not have noticed.

Preventing dizziness



- Drink plenty of fluids.
- Go slowly when you stand up to allow your blood pressure to adjust. Stay by the chair or bed for 20 seconds after standing up.
- Wear support stockings during the day to improve your circulation.
- Sit down when brushing teeth or putting on shoes.
- When getting out of bed, sit up and gently move your feet and legs for a little while, before standing up.

Managing constipation



- Eat plenty of fruit, vegetables, whole grains and high-fibre foods.
- Drink plenty of fluids.
- Do some physical activity (such as walking) daily, as this often helps.
- Talk to your doctor and take any laxatives as prescribed.

Coping with pain and other challenges



Learning relaxation or meditation may help you manage pain and discomfort. A psychologist can teach you these techniques, or try our *Finding Calm During Cancer* podcast. Some people find massage helps nerve pain, but check with your doctor first. TENS (transcutaneous electrical nerve stimulation) devices which send small electrical currents to parts of the body, and certain dietary supplements, are in clinical trials to see if they help. A counsellor or psychologist can help with the challenges caused by your diagnosis.

Talking about your sex life



Talk to your doctor about issues with erections, vaginal dryness or loss of libido as there may be medicines that can help.

The impact of peripheral neuropathy

This varies from person to person, but can include:

- discomfort and pain from physical symptoms
- trouble completing usual tasks (e.g. doing up buttons)
- high risk of burns and cuts due to numbness, which can increase the risk of infection during chemotherapy
- risk of not noticing injuries, which may become more serious because they aren't treated promptly
- high risk of falls and difficulty walking due to numbness or pain in your feet or feeling off-balance
- constipation and lack of bowel or bladder control
- poor sleep because of shooting pains
- not being able to drive because of symptoms
- feeling isolated or that you have lost your independence
- not being able to return to work or usual activities
- money issues because of health care costs.

Call Cancer Council 13 11 20 for help with these impacts.

Questions for your doctor

This checklist may help with what to ask your doctor.

- Am I at risk of peripheral neuropathy?
- Is there anything I can do to lower my risk?
- What symptoms should I watch out for?
- Who should I talk to if I notice any symptoms?
- If I have peripheral neuropathy, will chemotherapy be stopped? If so, how can the cancer be treated?
- How long are the symptoms likely to last?
- What treatment do you recommend for the pain?
- How can I manage any constipation?
- How can I reduce my risk of falls or other injuries?
- What aids and equipment might help me? Can you refer me to an occupational therapist?
- What type of exercise should I do? Can you refer me to a physiotherapist or exercise physiologist?
- Could a psychologist help me cope with changes?

Acknowledgements

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Cancer Council acknowledges Traditional Custodians of Country throughout Australia and recognises the continuing connection to lands, waters and communities. We pay our respects to Aboriginal and Torres Strait Islander cultures and to Elders past, present and emerging.



Where to get help and information

Call Cancer Council 13 11 20 for more information about peripheral neuropathy. Our experienced health professionals can listen to your concerns, put you in touch with services and send you our free booklets. You can also visit your local Cancer Council website.

ACT	actcancer.org
NSW	cancercouncil.com.au
NT	cancer.org.au/nt
QLD	cancerqld.org.au
SA	cancersa.org.au
TAS	cancer.org.au/tas
VIC	cancervic.org.au
WA	cancerwa.asn.au
Australia	cancer.org.au

Other useful websites

You can find many useful resources online, but not all websites are reliable. These websites are good sources of support and information.

Cancer Council podcasts	cancercouncil.com.au/podcasts
American Cancer Society	cancer.org
Cancer Research UK	cancerresearchuk.org
eviQ (cancer treatment information)	eviq.org.au (search for peripheral neuropathy)
Macmillan Cancer Support (UK)	macmillan.org.uk
Peter MacCallum Cancer Centre	petermac.org (search for peripheral neuropathy)

Note to reader

Always consult your doctor about matters that affect your health. This fact sheet is intended as a general introduction and is not a substitute for professional medical, legal or financial advice. Information about cancer is constantly being updated and revised by the medical and research communities. While all care is taken to ensure accuracy at the time of publication, Cancer Council Australia and its members exclude all liability for any injury, loss or damage incurred by use of or reliance on the information provided in this fact sheet.