YOUR GUIDE TO NEUROPATHY

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contents

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NEUROPATHY

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Printing Press :
RMOSS Prints Pvt Ltd.
Flat No.: 404, Shanti Bhavan, Plot No. 66, Rajasthan Society, J. B. Nagar, Andheri (East), Mumbai 400059

Place of Publication :
Health Media Publishing Pvt Ltd.
G2, Akruti Centre Point, MIDC, Andheri (East), Mumbai 400093

Sometimes pain was like a storm that came out of nowhere.

— Benjamin Alire Sáenz

What Is Neuropathy?

Neuropathy or nerve damage is a debilitating condition that affects millions of people the world over. Studies from the various regions of India show that overall prevalence of Peripheral Neuropathy varies from 5 to 2400 per 10,000 population.[1] Neuropathy is not a disease on its own but the symptom of an underlying illness. Neuropathy affects the peripheral nerves. Peripheral nerves are all the nerves in the body that are outside the brain and spinal cord. These are the nerves that give us feeling and sensitivity. They also tell us about movement, pressure, hot and cold. If the nerve becomes injured due to chemical or physical damage, it makes you aware of this by sending you warning signals in the form of pain, tingling, and numbness.[2]

Treat Early For Good Results

It is important to address these symptoms right away, because in some people the underlying problem is treatable. Delays in identification and treatment may lead to symptoms progressing and irreversible damage.

Types Of Neuropathy

Healthcare experts classify neuropathy into
- focal and
- generalised peripheral neuropathies.

1. Focal Neuropathy – It means means only one or, at most, a few nerves are injured and pain, numbness, and weakness are confined to a single limb or a small region of the trunk or head. Focal neuropathies are typically caused by compression or trauma. An example of this would be the Carpal Tunnel Syndrome, which is a slowly progressive condition causing tingling, numbness, and pain in the hand and fingers, with weakness and wasting of muscle at the base of the thumb and is seen mostly among those whose work involves repetitive wrist motions.[3]

2. Generalised Neuropathies – They are also called polyneuropathies, show up as pain, numbness, tingling, and, sometimes, weakness that affects both sides of the body. The feet and toes are commonly affected early. Generalised neuropathies are often associated with general medical problems.[4] Medical problems that may be associated with neuropathy include: 1) metabolic diseases such as diabetes mellitus; 2) autoimmune diseases such as lupus; 3) organ failure; 4) endocrine (hormonal) diseases such as hypothyroidism; 5) infections such as Lyme disease and HIV.[5]

What **Causes** Neuropathy?

There are many causes of neuropathy. Here's a look at some of them:

Medical conditions: The most common cause is diabetes. Diabetic peripheral neuropathy is the most common polyneuropathy in the world. Other medical causes are lupus, organ failure, thyroid problems, and infections such as Lyme disease or HIV. Chronic kidney dysfunction triggers an imbalance of salts and chemicals which can cause peripheral neuropathy.

Genetic or hereditary factors: Having a family member, and especially a parent, who's been diagnosed with a hereditary neuropathy is the most significant risk factor. Genetic neuropathies tend to present early in life and progress very slowly over time. Some studies suggest that health conditions, such as type 2 diabetes and obesity, may increase your risk for certain hereditary neuropathies.[5]

Arthritis and direct nerve injuries from sprains, fractures, compression and trauma: Broken bones and accompanying casts can pressure nerves directly. Carpal tunnel syndrome, mentioned earlier, is an example of a focal neuropathy. Compression of a major forearm nerve called the median nerve causes this syndrome.

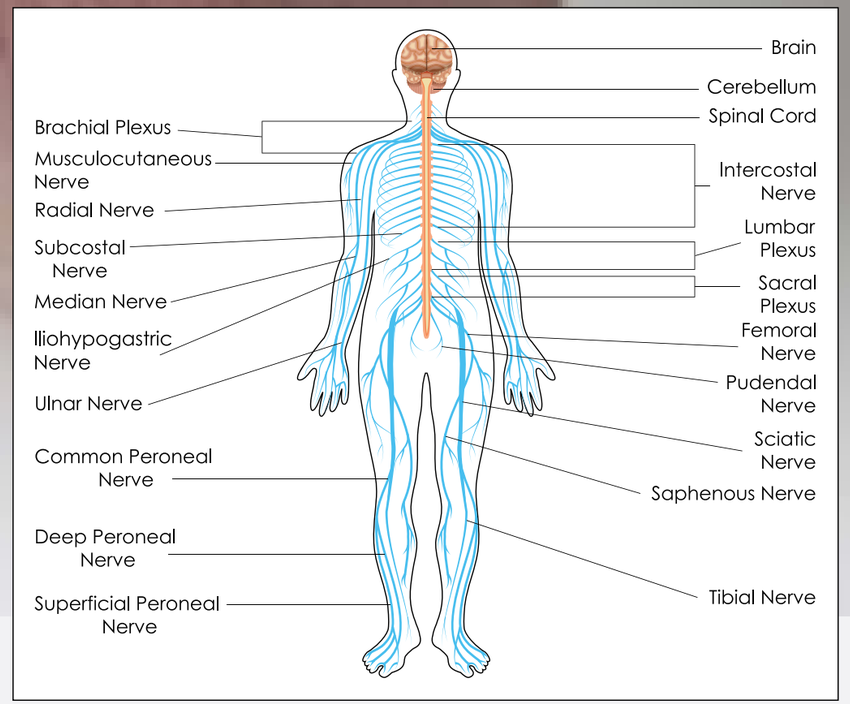
Nutritional deficiencies (eg. B12 deficiency): Deficiencies of certain vitamins and minerals, including the B vitamins, vitamin E, and copper, can cause peripheral neuropathy.

Medication toxicity (eg. chemotherapy): Certain chemotherapeutic drugs are known for causing peripheral neuropathies.

Lead toxicity: A wide array of industrial chemicals including solvents and heavy metals, arsenic and lead, can cause neuropathy. If the toxin can be identified and removed, the peripheral neuropathy typically stabilises and then improves.

Alcoholism: Alcoholic patients may become deficient in thiamine (a B vitamin) if they do not eat well. This deficiency is thought to contribute to alcoholic polyneuropathy.[6]

Idiopathic causes: Idiopathic neuropathies probably arise out of complex metabolic and genetic factors. Idiopathic means of no known cause. This type of neuropathy is very common, making up about a third of all neuropathies. This diagnosis simply means that the exact causative factor is unknown.[7]



What Are The **Symptoms?**

The most common symptoms of neuropathy include:

- Numbness or tingling in the limbs or extremities
- Chronic pain in an area of the body
- Fatigue
- Weakness or tremors not present before
- Stiff neck or back muscles
- Pins and needles feelings
- Burning or itching sensations
- Sharp, shooting pain, especially with movement
- Limited range of motion
- Headaches or migraines
- Inflammation and swelling in the knees, calves, shoulders and joint bones
- Foot and ankle pain.[8]

What Is Neuropathic **Pain?**

Neuropathic pain is caused by damage or injury to the nerves that transfer information between the brain and spinal cord from the skin, muscles and other parts of the body. Pain is an important symptom of neuropathies that affect sensory fibres. The pain can be described as burning, lancinating, tingling, or shock-like. Some people may find it hard to wear thick clothes as even slight pressure can aggravate the pain.

Pain is a very complex condition and each person is affected differently. It has many physical and psychological aspects to it and people can experience different levels of fatigue, anxiety, mood changes and depression as related to neuropathic pain. As it can't be seen, it is hard to explain to someone exactly what it feels like and therefore it is hard for others to understand just how much it can affect everyday life. Here is a pain scale to for you to be able to describe to your doctor the extent of how much you hurt. *(see figure below)*

Neuropathic pain does not resolve quickly; it's a chronic condition which leads to persistent pain symptoms. For many patients, the intensity of their symptoms can wax and wane throughout the day.

Symptoms of neuropathic pain

People may describe their symptoms to their doctors as

- sharp
- dull
- hot
- cold
- sensitive
- itchy
- deep
- stinging or
- burning. Additionally, some patients may feel pain with a light touch or pressure.

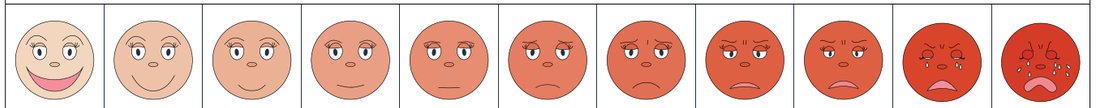
Although neuropathic pain is thought to be associated with peripheral nerve problems, such as neuropathy caused by diabetes, injuries to the brain or spinal cord can also lead to chronic neuropathic pain.

The risk factors for neuropathic pain

Anything that leads to loss of function within the sensory nervous system can cause neuropathic pain.

- Nerve problems from carpal tunnel syndrome or similar conditions
- Trauma, causing nerve injury
- Other conditions which can predispose you to developing neuropathic pain include diabetes, vitamin deficiencies, cancer, HIV, stroke, multiple sclerosis, shingles, and cancer treatments.

COMPARATIVE PAIN SCALE CHART (Pain Assessment Tool)



0 Pain Free	1 Very Mild	2 Discomforting	3 Tolerable	4 Distressing	5 Very Distressing	6 Intense	7 Very Intense	8 Utterly Horrible	9 Excruciating Unbearable	10 Unimaginable Unspeakable
No Pain	**Minor Pain**			**Moderate Pain**			**Severe Pain**			
Feeling perfectly normal	Nagging, annoying, but doesn't interfere with most daily living activities. Patient able to adapt to pain psychologically and with medication or devices such as cushions.			Interferes significantly with daily living activities. Requires lifestyle changes but patient remains independent. Patient unable to adapt to pain.			Disabling; unable to perform daily living activities. Unable to engage in normal activities. Patient is disabled and unable to function independently.			

(Visual analog scale (VAS) for pain)

How Will Your **Doctor Diagnose** Neuropathic Pain?

The doctor may:

1. Check your history and advise testing to assess loss of function, touch, distinguish sharp from dull pain, discern temperature and vibration.
2. Investigate for underlying causes such as vitamin deficiencies or thyroid abnormalities.
3. Advise imaging studies to exclude structural lesions impacting the spinal cord.
4. In case of diabetic neuropathy, he may direct you to a diabetologist to stabilize your blood sugar.

Alleviating neuropathic pain depends on the underlying cause. If the cause is reversible, then the peripheral nerves may regenerate and the pain will abate; if not, then medication along with lifestyle changes will help you. Many patients with neuropathic pain are able to find a significant measure of relief.

How Is Neuropathic Pain Different From **Nociceptive Pain?**

Neuropathic pain is different than Nociceptive pain.

Nociceptive pain is the body's reaction to painful stimuli such as a pulled back muscle or bone, and it does not cause nerve damage itself.[11] It is usually acute and develops in response to a specific situation and tends to go away as the affected body part heals. The most common areas for people to experience nociceptive pain are in the musculoskeletal system, which includes the joints, muscles, skin, tendons, and bone. Internal organs, such as the intestines, lungs, and heart, can also be subject to nociceptive pain, along with the smooth muscles.

What are the symptoms?

A person can experience neuropathic and nociceptive pain at the same time. To understand the type of pain, you should talk to a specialist. Paying attention to key differences can improve the quality of life and help you get the correct treatment.

Nociceptive pain can develop anywhere on the body in response to trauma. It is usually most severe at the time of injury.

Neuropathic pain report a variety of symptoms, including sharp, shooting, searing, or stabbing pain, tingling, numbness, extreme sensitivity to touch, insensitivity to heat or cold, muscle weakness and pain worsens at night.

Nociceptive vs Neuropathic Pain

Nociceptive Pain
Body's reaction and response to potentially tissue- damaging stimuli such as pulled back muscle or bone.

- Postoperative pain
- Mechanical low back pain
- Sports/exercise injuries
- Sickle cell crisis
- Arthritis

Mixed Type
Caused by a combination of both primary injury or secondary effects.

Neuropathic Pain
Pain that develops when the nervous system is damaged due to disease or injury. It may be caused by inflammation, irritation or nerve tissue compression. Add relevant reference.

- Postherpetic neuralgia
- Neuropathic low back pain
- Distal polyneuropathy (eg, diabetic, HIV)
- Trigeminal neuralgia
- Central post-stroke pain
- CRPS*

*Complex regional pain syndrome

Prevention

The best way to prevent neuropathic pain is to avoid development of neuropathy. Nerve care is possible by

- Modifying lifestyle choices
- Limiting the use of tobacco and alcohol
- Maintaining a healthy weight to decrease the risk of diabetes, joint problems or stroke
- Taking care to prevent repetitive stress injury.

What Is **Diabetic** Neuropathy?

As per the statistics of World Health Organization, it is estimated that more than 422 million adults are living with diabetes. The Centre for Chronic Disease Control in India (CCDC) states that nearly 30-50% of patients with diabetes gradually develop diabetic peripheral neuropathy pain.[12]

Diabetic Peripheral Neuropathy (DPN) describes a family of nerve disorders that are directly caused by complications from diabetes. It is the most common type of PN. Research consistently shows the relationship between maintaining healthy glucose levels and nerve damage. Over time, high blood sugar levels can damage the small blood vessels which supply the nerves in your body. This prevents essential nutrients reaching the nerves. As a result, the nerve fibres can become damaged, and they may disappear. This can cause problems in many different parts of your body, depending on the type of nerve affected.[13]

People with diabetes who have trouble controlling their blood sugar levels, along with high cholesterol, high blood pressure, and obesity, are at an elevated risk for developing DPN. The longer you live with diabetes, the more likely you are to develop some form of neuropathy, and people who live with diabetes for more than 25 years are most likely to suffer from DPN. It is estimated that the prevalence of Neuropathy in diabetes patients is approximately 20%. Diabetic Neuropathy is implicated in 50-75% of non-traumatic amputations.[14]

Consequences

DPN causes pain or loss of sensation in the feet, legs, hands and arms. As this condition progresses, the damage to your body can be permanent, with loss of sensation leading to sores, ulcers, and, in the worst of cases, lower-limb amputation. DPN can strike at any time, regardless of age, gender, or ethnic background.

Treatment

There are many treatments available to relieve the symptoms caused by neuropathy. This may include medication for nausea and vomiting, painkillers or treatment to help with erectile dysfunction. Steps you can take to avoid diabetic neuropathy

- Keep your blood sugar levels within your target range
- Have your feet checked at least once a year.
- Tell your doctor if you think you're developing any signs of neuropathy
- If you think you've lost sensation in your feet, protect them from injury, check them every day, and talk to your diabetes healthcare team.

Can **Eating Right** Help DPN?

Most cases of type 2 diabetes are preventable with healthy lifestyle changes. Good nutrition is often the first line of defense to prevent peripheral neuropathy. You don't need special foods or complicated diets.

Choose a diet rich in fruits, vegetables and whole grains.

Have a diet rich in vitamin B12: This should include

- Peas, beans, lentils
- Poultry, eggs, red meat and fish
- Nuts and Seeds
- Low fat or fat-free milk.

Limit your refined carbs and sugary drinks.

Keep regular meal and snack times.

Size matters.

Exercise

One of the best ways of combating diabetes and diabetic neuropathy is to get moving. There are different ways in which physical activity will help you:

- Exercise burns calories, which will help you lose weight or maintain a healthy weight
- Regular exercise can help your body respond to insulin and is known to be effective in managing blood glucose
- Exercise can lower blood glucose
- Exercise can improve your circulation, especially in your arms and legs, where people with diabetes can have problems
- Exercise can help reduce your cholesterol and high blood pressure
- Exercise helps reduce stress, which can raise your glucose level

See your doctor before you begin an exercise regimen.

Physiotherapy

Physiotherapy can be an effective treatment option for patients with diabetes. This is how it works:

- It can help alleviate symptoms brought on from diabetic neuropathy and help you deal with pain in the feet and legs, tingling or burning sensation, muscle cramps, muscle weakness etc.
- It can also relieve stiffness, improve mobility, relieve neuropathic pain, reduce oedema, and heal resistant foot ulcer.
- It will help gait training, posture training, and ways to prevent and stabilise foot complications.
- It will help to prevent muscle contractures, spasms and atrophy.
- Pelvic floor muscle exercises can improve sexual dysfunction caused by neuropathy.

Neuropathy: Dos & Don'ts

Here are a few dos and don'ts that you could be looking at in order to reduce the burden of neuropathy and to enjoy a better quality of life:

Do

- Maintain a good weight.
- Control your blood sugar.
- Keep your salt intake at the right levels.
- Protect your feet.
- Choose the right exercise.
- Limit alcohol.
- Stop smoking.
- Avoid harsh household products.

Don't

- Have artificial sweeteners.
- Skip meals.
- Walk around barefoot.
- Wear the wrong shoes.
- Avoid eating processed foods including deep fried foods, cheese, butter, whole milk, and fatty meat.

Nutrition & Neuropathy: What Should You Be Eating?

Good nutrition is often the first line of defence to avoid many diseases, including peripheral neuropathy. Here are some recommendations according to the Foundation for Peripheral Neuropathy[13]:

- Establish your diet around vegetables, fruits, whole grains, legumes, omega-3 rich foods and lean protein sources .

Fruits and vegetables – Fruits and vegetables are filled with various minerals, vitamins, antioxidants, and dietary fibres. They work to create a strong immune system while at the same time preventing and fighting disease and illness. Antioxidants, which are compounds produced in the body and found in certain foods, prevent cell damage that may occur because of oxidative stress from free radicals. Free radicals are molecules that are created within the body and are necessary for certain functions, but when there are not enough antioxidants in a system then free radicals build up and cause oxidative stress which can lead to chronic diseases like cancer, type 2 diabetes and heart disease. Antioxidants are even more important for those suffering from neuropathy because they have neuroprotective properties and have been linked to hindering the progress of neuropathic impairments. Some of the best sources are blueberries, strawberries, kale, red cabbage and beans. Aim for 5-10 servings of colourful fruits and/or vegetables daily.

Many people who have neuropathy also have diabetes, and eating plenty of fruits and vegetables means that you will also be better able to control your weight as also your risk of diabetic complications. Apart from berries, try to choose grapefruit, oranges, Brussels sprouts, onions, and bell peppers.

Whole grains – Refined grains have a high glycaemic level and significantly impact your blood sugar. Have whole grains instead of refined grains. Good sources are whole wheat flour, oats, brown rice, rye, barley, cracked wheat or dalia, quinoa, jowar and bajra.

Lean protein – Lean protein is necessary for your body to be able to build and repair new tissue. It is important to stick to lean protein, so that you don't eat too many animal fats. Good sources include fish, tofu, yogurt, low fat milk, legumes, and skinless poultry.

Other tips to keep in mind

- Limit/avoid alcohol
- Lower saturated fats and trans fatty acids by choosing lean meats and poultry, and low-fat or non-fat dairy products
- Choose monounsaturated fats and polyunsaturated fats (from fish, nuts, and vegetable oils) in lieu of saturated and trans fats
- Choose/prepare foods and beverages with little added sugars/ caloric sweeteners and only a moderate amount of salt.
- Water - When you get dehydrated, your blood starts to thicken and your muscles go into spasm. As a result, inflammation occurs and affects areas where pain receptors and nerves are located. If you ensure that you are always hydrated, your overall bodily functions are better able to function as well, thereby increasing your overall wellbeing.[14]

Get Your Vitamin B12

Lack of certain vitamins have been clearly linked to various conditions, including peripheral neuropathy. Vitamin B12 is one of these vitamins.

What is Vitamin B12?

Vitamin B12, also known as Cobalamin, is an essential nutrient. We need Vitamin B12 for making red blood cells, DNA, RNA and myelin, a protective coating around the nerves which covers nerve fibres. Vitamin B12 promotes nerve health by helping repair, rebuild and maintain the myelin sheath as also promoting regeneration of damaged nerves.[15]

Where is it found?

It is found naturally in animal products like fish, poultry, milk, eggs and dairy products. It can also be added to fortified foods, such as cereals. We can obtain sufficient B12 by either eating foods that contain Vitamin B12, or taking supplements with Vitamin B12.

What happens when we have a vitamin B12 deficiency?

Vitamin B12 deficiency can lead to a number of serious conditions, one of them being peripheral neuropathy. Left untreated, it can cause permanent nerve damage. Anaemia is often one of the first signs of Vitamin B12 deficiency. Vitamin B12 deficiency can progress into degeneration within the spinal cord which can cause loss of sensation in both the hands and feet simultaneously. Your doctor might recommend oral supplementation of Vitamin B12 and, sometimes, Vitamin B12 injections.

Why we should take B12 supplements

Says a 2017 study from the Federal University of Rio de Janeiro, Brazil and the New York-Presbyterian Hospital/Weill-Cornell Medical Center, New York, "In addition to their important role in the maintenance of body functions, including repair, development, and growth, there is increasing evidence of an involvement of the B complex vitamins in the peripheral nervous system, in promoting acceleration of nerve repair, both in enhancement of nerve regeneration and recovery of nerve function.[16]

Tweak Your **Lifestyle** A Little...

Other than the Dos and Don'ts mentioned above, here are some coping strategies[17]. You must find what works for you.

Manage diabetes. Making sure diabetes is well controlled may help encourage nerve regeneration. Maintaining healthy blood sugar levels has also been shown to reduce neuropathy symptoms and prevent further nerve damage.[18]

Take your pain seriously. A 2004 article published in the Journal of Neuroscience says that chronic pain actually shrinks the grey matter in your brain. Says the study, "Given that normal whole-brain grey matter atrophy is 0.5% per year of aging and that atrophy caused by chronic pain is 5-11%, the magnitude of brain grey matter atrophy caused by

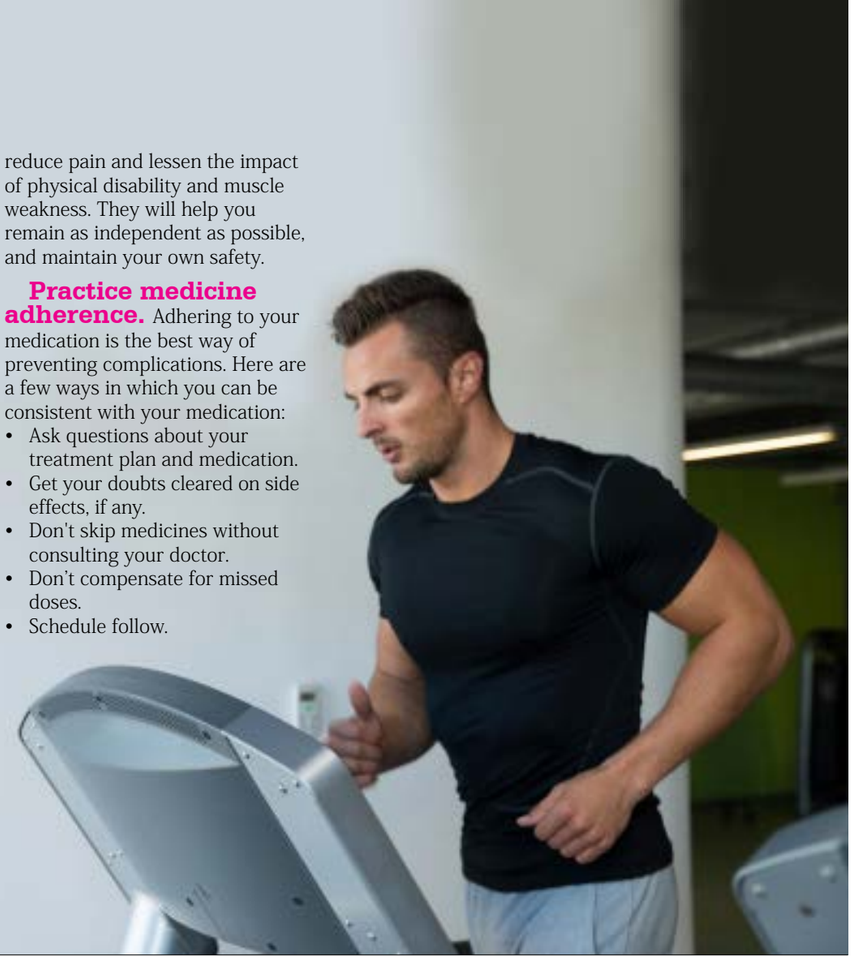
chronic pain is equivalent to 10-20 years of aging." This means, pain can actually age your brain by up to two decades! This ageing of the brain has been linked to depression, anxiety, headaches, and even Parkinson's and Alzheimer's disease.[19]

Be diligent with the rehabilitation programme. Progressive and selective muscle strengthening exercises will work to recover muscle strength. Aerobic activities, like using an exercise bike or treadmill with a progressive increase in intensity and duration, can help. Stretching exercises and the treadmill have given excellent results in improving walking in patients suffering from hereditary neuropathies.[20] Muscle strengthening and balance exercises, unstable platforms, treadmill, represent valid strategies to improve stability and coordination in patients with peripheral neuropathies, and to reduce their risk of falls.[21]

Make use of assistive devices. Mechanical aids and other assistive devices can help reduce pain and lessen the impact of physical disability and muscle weakness. They will help you remain as independent as possible, and maintain your own safety.

Practice medicine adherence. Adhering to your medication is the best way of preventing complications. Here are a few ways in which you can be consistent with your medication:

- Ask questions about your treatment plan and medication.
- Get your doubts cleared on side effects, if any.
- Don't skip medicines without consulting your doctor.
- Don't compensate for missed doses.
- Schedule follow.



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