

Together we bring  
information, resources  
and **hope** to those  
suffering with Diabetic  
Peripheral Neuropathy



The Foundation for  
Peripheral Neuropathy

The Neuropathy  
Action Foundation

# Who we are

The Foundation for Peripheral Neuropathy (FPN) is committed to dramatically improving the lives of those living with Peripheral Neuropathy (PN). By fostering collaboration among today's most gifted neuroscientists and physicians, who are dedicated to neuropathy research and treatment, our goal is to support development of new and effective therapies that will reduce and one day even cure PN.

The Neuropathy Action Foundation (NAF) is dedicated to ensuring neuropathy patients obtain the necessary resources, information and tools to access individualized treatment to improve their quality of life. The NAF increases awareness among physicians, appropriate institutions, the general public and public policy officials that neuropathy can potentially be a serious, widespread and disabling condition, which may be treatable when appropriate medical care is provided.



FOUNDATION



**Neuropathy**  
*Action* →  
**Foundation**

Awareness • Education • Empowerment

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Our work doesn't end with our search for a cure; in many ways, it is just beginning. Knowledge is power, and informed patients are able to assume control of their health in new ways thanks to our efforts to provide them with the tools and resources that help them live with PN. Together FPN and NAF are initiating outreach programs to raise awareness about Diabetic Peripheral Neuropathy (DPN), its symptoms, and treatment options so that people living with DPN can have fulfilling and meaningful lives and healthcare professionals can provide optimal care and support for their patients.

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*To people with DPN, we offer information, resources and, most of all, hope.*



## What is Peripheral Neuropathy?

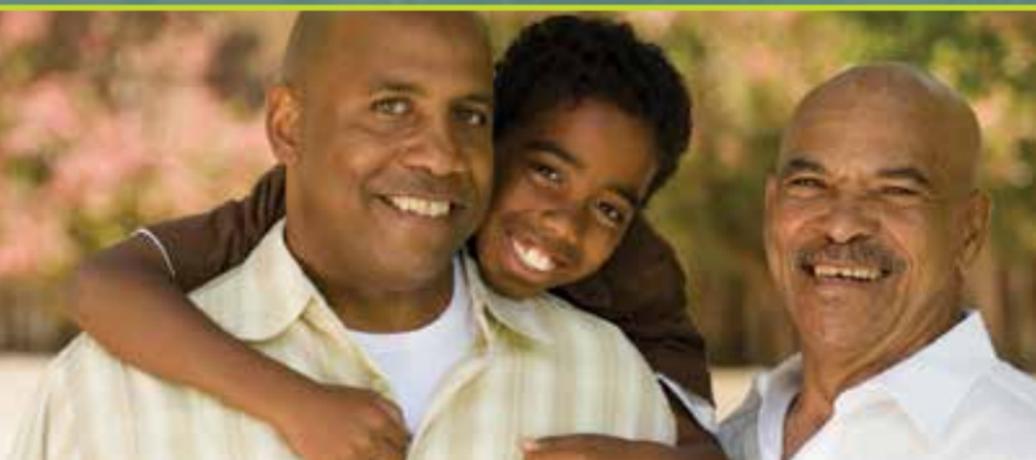
Peripheral Neuropathy is the often painful and debilitating condition that is caused by damage to the peripheral nervous system—the complex web of nerves that connect the central nervous system (the brain and spinal cord) to the rest of the body. There are 20 million Americans suffering from PN—a staggering 13.8 million of them (68%) are diabetics.

# What is Diabetic Peripheral Neuropathy?

Diabetic Peripheral Neuropathy describes a family of nerve disorders that are directly caused by complications from diabetes. DPN can strike at any time, regardless of age, gender, or racial/ethnic background. People with diabetes who have trouble controlling their blood glucose (or blood sugar) levels, along with high cholesterol, high blood pressure, and obesity are at an elevated risk for developing DPN.

Diabetic peripheral neuropathy (DPN) is the most common type of PN, causing 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.

While current research consistently shows the relationship between maintaining healthy glucose levels and nerve damage, DPN can be caused by a combination of different factors. In fact, although symptoms can present at any time, 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.



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## Nerve damage is often due to a combination of factors:

- metabolic factors, such as high blood glucose, long duration of diabetes, abnormal blood fat levels, and possibly low levels of insulin
- neurovascular factors, leading to damage to the blood vessels that carry oxygen and nutrients to nerves
- autoimmune factors that cause inflammation in nerves
- mechanical injury to nerves, such as carpal tunnel syndrome
- inherited traits that increase susceptibility to nerve disease
- lifestyle factors, such as smoking or alcohol use

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## What does DPN feel like?

Symptoms vary from patient to patient and can involve the sensory, motor, and autonomic—or involuntary—nervous systems. The first symptom is often numbness, tingling, or pain in the feet and can range from mild to severe. Mild symptoms can go unnoticed for years, only to occur with increased severity over several years until they begin to interfere with your daily life. In some people, the onset of pain may be sudden and severe.

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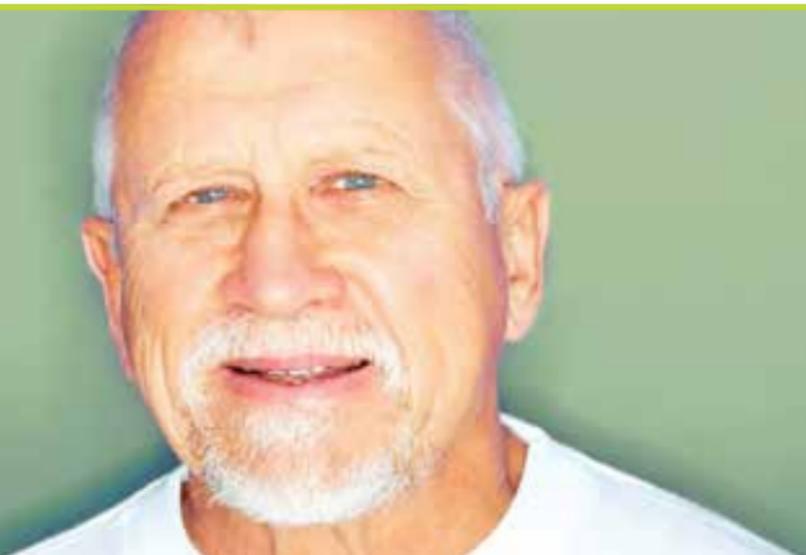
## Symptoms of DPN may include:

- ▶ Numbness, tingling, or pain in the toes, feet, legs, hands, arms, and fingers
- ▶ Wasting of the muscles of the feet or hands
- ▶ Sharp pains or cramps
- ▶ Extreme sensitivity to touch
- ▶ Loss of balance and coordination
- ▶ Weakness
- ▶ Dizziness, fainting due to a drop in blood pressure
- ▶ Stomach upset, constipation or diarrhea
- ▶ Hypoglycemia unawareness – no longer being able to notice symptoms of low blood sugar
- ▶ Difficulty with urination
- ▶ Erectile dysfunction

While not directly associated with DPN, many patients also experience depression. Diabetic peripheral neuropathy can often lead to the loss of reflexes, especially at the ankle, and cause changes to the way that you walk. Foot deformities, like hammertoe and midfoot collapse, can also occur, and blisters and sores may develop in areas of the foot that are numb to the pressure or injury. Foot injuries, if not properly treated, can cause infection deep into the bone and result in amputation but, if minor problems are treated, this drastic course of treatment will not be necessary.

## I am not diabetic— so why do I have DPN?

DPN can affect patients that are at risk for diabetes, called pre- or borderline diabetes. Your doctor may also use the term glucose intolerance. Such patients have higher than normal blood sugar levels, but not so high that they are diagnosed with true diabetes; a diagnosis of pre-diabetes can be made from a blood test since symptoms are often not present. If not properly diagnosed and managed, then pre-diabetes can lead to the development of type 2 diabetes, heart disease, and nerve damage, including DPN.



- 23.6 million Americans, or 8% of the population, have been diagnosed with diabetes
- An estimated 60-70% of Diabetics suffer from peripheral neuropathy
- Diabetes is expected to increase the prevalence of PN by more than 10% by 2012
- Undermanaged diabetic peripheral neuropathy is the number one cause of non-traumatic lower limb amputations in the United States

# How is DPN diagnosed?

If you already live with diabetes and you think you might have DPN, there are several tests that you and your doctor can use to evaluate your condition and establish a treatment plan, including a comprehensive foot exam, a physical exam, neurological evaluation, electromyography, nerve conduction velocity tests, quantitative sensory testing, nerve or skin biopsy, and/or blood studies to rule out causes other than your diabetes.

- *Nearly 54,000 diabetics have amputations each year*
- *More shocking is the fact that 75% of amputations are preventable*
- The total estimated cost of diabetes in 2007 was \$174 billion
  - *\$116 billion in excess medical expenditures*
  - *\$58 billion in reduced national productivity and \$58 billion to treat the portion of diabetes-related chronic complications such as DPN*
- People with diagnosed diabetes incur average expenditures of \$11,744 per year of which \$6,649 is attributed to diabetes

## How is DPN treated?

The first—and most important—thing that you can do is to manage your blood glucose levels, which can prevent further nerve damage. Management of your diabetes plays a critical role in treating DPN, so keep your blood sugar levels in normal range with frequent testing, proper diet, physical activity, diabetes medicine and/or insulin therapy.

Most treatments today are centered on pain reduction and improvement in function. Effective treatment for injured nerves (neuropathic pain) often requires a combination of medicines, exercise and other therapies. It can take some time to find the combination that is right for you.

Mild pain may respond to a simple over-the-counter drug, like ibuprofen and acetaminophen. Or, your doctor may prescribe one or more medicines for you. More commonly used medicines include neuropathic pain agents, most often, anti-seizure medicines or certain anti-depressants. Your doctor can share more information about the different prescription medications that can help you—because you don't have to suffer from depression to benefit from these medications. Talk with your health care provider about options for treating your neuropathy.

NAF provides resources to help you navigate through the questions and concerns on your prescription drug insurance and your rights to access necessary medication. In addition we assist patients by providing sample letters and contacts to help you advocate for and receive the medications/treatments you are entitled to. For more information please visit [www.neuropathyaction.org](http://www.neuropathyaction.org).

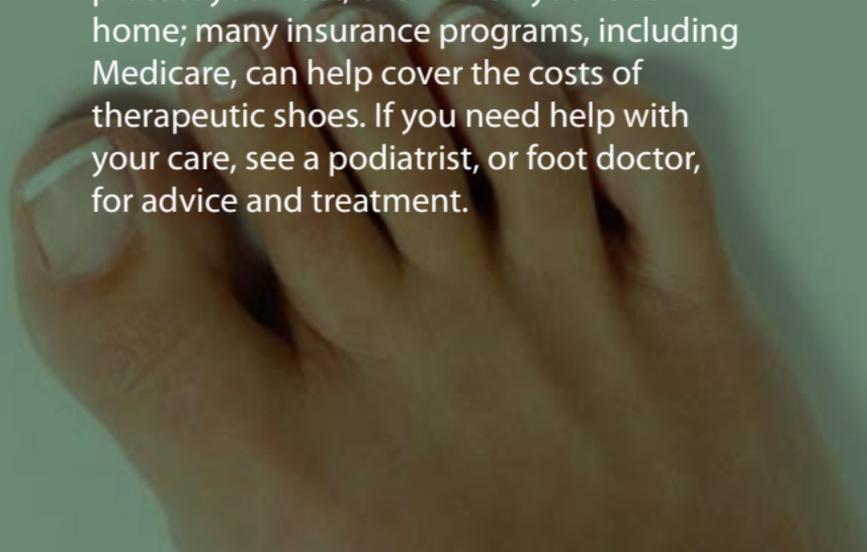
Some medications used to help relieve diabetic nerve pain include:

- tricyclic antidepressants, such as Elavil or Cymbalta
- anticonvulsants, such as pregabalin (Lyrica), gabapentin (Gabarone, Neurontin)

Treatments that are applied to the skin—typically to the feet—include capsaicin cream and lidocaine patches. Studies suggest that nitrate sprays or patches for the feet may relieve pain. Studies of alpha-lipoic acid, an antioxidant, and evening primrose oil have been shown to help relieve symptoms and may improve nerve function. With any of these supplements or treatments mentioned above it is best to consult your doctor before using them.

Supportive treatments include a device called a bed cradle that can keep sheets and blankets from touching sensitive feet and legs, occupational or physical therapy to increase muscle strength, mobility and function, and an orthopedic insert or specially designed shoe that can even out an improper gait. Treatments that involve electrical nerve stimulation, magnetic therapy, and laser or light therapy may be helpful but need further study.

Take care of your feet. Inspect them daily for injuries, blisters, or sores, and wash them carefully. Wear shoes or slippers to protect your feet, even when you're at home; many insurance programs, including Medicare, can help cover the costs of therapeutic shoes. If you need help with your care, see a podiatrist, or foot doctor, for advice and treatment.



# Why exercise?

- 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 and possibly reduce the amount of medication you need to treat diabetes, or even eliminate the need for medication
- 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
- In some people, exercise combined with a meal plan, can control Type 2 Diabetes without the need for medications

*See your doctor before you begin an exercise program. Your doctor can tell you about the kinds of exercise that are good for you depending on how well your diabetes is controlled and any complications or other conditions you may have.*



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# Can eating right really help?

There are two kinds of diabetes. Type 1 diabetes, once called juvenile diabetes, is diagnosed at an early age and is the least common form of diabetes. Type 2 diabetes accounts for 90 to 95% of all diagnosed cases of diabetes. While type 1 diabetes cannot be prevented or reversed, most cases of type 2 diabetes are preventable with healthy lifestyle changes. You have more control over your health than you think. If you or your doctors are concerned that you might be at risk, take charge of your life—eat healthy, keep your weight in check, and get moving, every day!

You don't need special foods or complicated diets with a hefty price tag—your nutritional needs are the same as everyone else. Proper eating habits can provide many benefits to improving your health, including preventing and even reversing the onset of type 2 diabetes. Even if you've already been diagnosed, an ideal diet of foods that are high in nutrients and low in fat, such as fruits, vegetables, and whole grains will help you manage your condition and feel better, every day. Here are some other tips for eating right with diabetes on the next page.

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**What you eat.** Making the right choices in your diet will make a huge difference! Limit your refined carbs and sugary drinks; choose water over soda, and drink skim milk instead of 2% or whole milk. Choose baked or broiled foods over fried, and limit your sodium intake to no more than 2300 mg per day. Not sure where to start? Keep track of your daily food intake and calorie consumption with our daily food log, available on our website at [www.foundationforpn.org](http://www.foundationforpn.org). Share your food diary with your doctor and discuss where you can improve.

**When you eat.** You are what you eat, but when you eat is just as important when managing your diabetes. Keep regular meal and snack times to keep your blood sugar levels constant.

**How much you eat.** Size matters. Even if you stick with healthy foods, eating too much of a good thing can make you gain weight, which then puts you at risk of developing or complicating diabetes. Use the following chart to divide your dinner plate into three sections:

#1

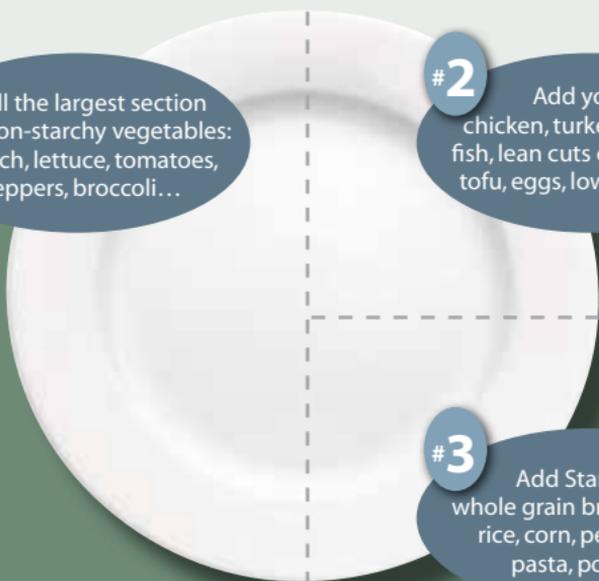
Fill the largest section with non-starchy vegetables: spinach, lettuce, tomatoes, peppers, broccoli...

#2

Add your meat: chicken, turkey (no skin), fish, lean cuts of beef, pork, tofu, eggs, low-fat cheese

#3

Add Starch Foods: whole grain breads, brown rice, corn, peas, beans, pasta, potatoes



**Stay hydrated.** Drinking plenty of water is essential to maintaining a healthy lifestyle. Drink 6-8 eight ounce glasses of water each day; if that's hard, incorporate foods with high water contents, like fruits (fresh, frozen, or canned in juice or light syrup) into your meals.

## What else can I do?

In addition to working with your doctors to manage your diabetes and your DPN, many people find comfort by exploring complementary and alternative medicine (CAM). Many patients find that an integrative approach—one that uses both conventional methods and CAM therapies—is the safest and most effective way to manage their overall health. Examples of complementary and alternative treatments that might help you include biofeedback, Oriental medicine (acupuncture), and relaxation techniques such as meditation, massage and yoga. You can learn more about these treatments on our website at **[www.foundationforpn.org](http://www.foundationforpn.org)**.

To learn more about our organizations and the important work we are doing on your behalf please visit our websites at:

[www.foundationforpn.org](http://www.foundationforpn.org)  
[www.neuropathyaction.org](http://www.neuropathyaction.org)



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