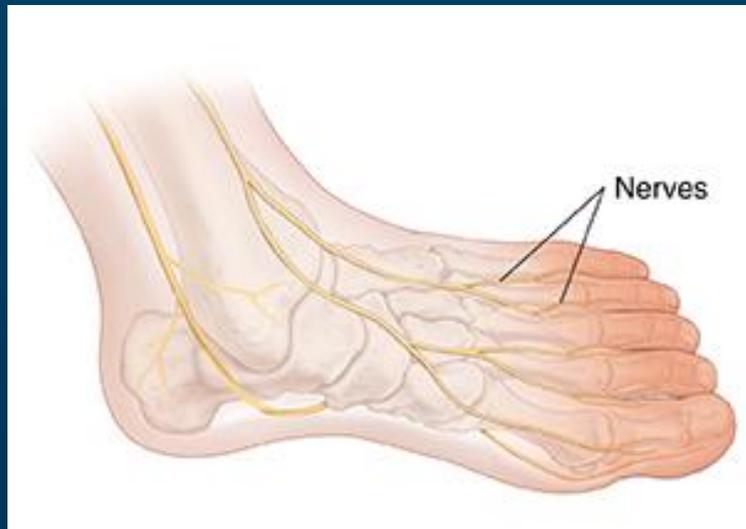


Peripheral Neuropathy and Your Feet



December 7, 2023

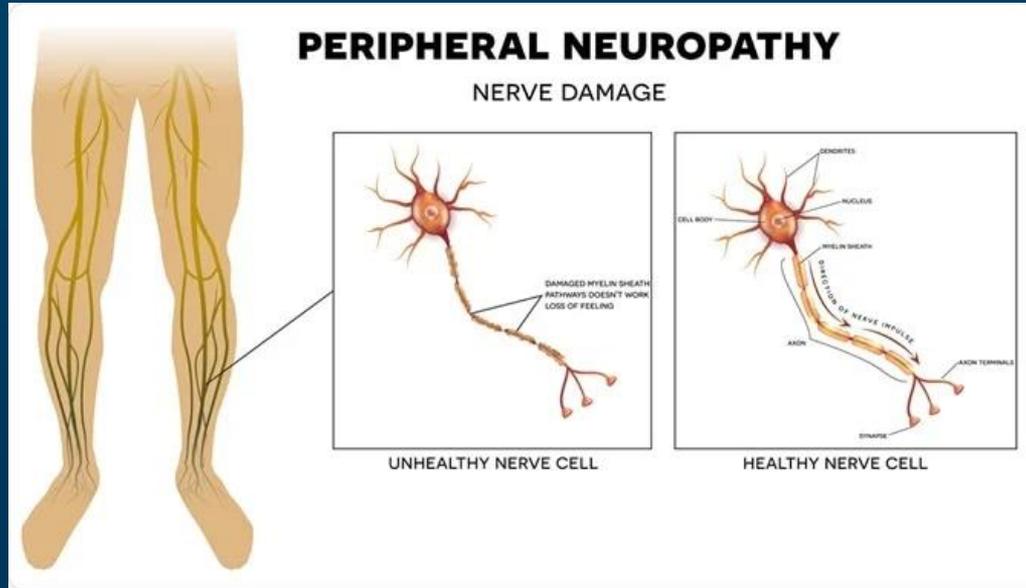
Dr. Roberto Araujo
Riderwood Podiatrist

The Topics

- What is peripheral neuropathy? Signs and symptoms
- What causes peripheral neuropathy?
- Complications from peripheral neuropathy
- How to detect peripheral neuropathy
- What to do about peripheral neuropathy

What is peripheral neuropathy?

- Happens when the nerves that are located outside of the brain and spinal cord (peripheral nerves) are damaged.



Signs and symptoms

- Every nerve in the peripheral system has a specific job. Symptoms depend on the type of nerves affected.
- **Sensory nerves** receive **sensation**, such as temperature, pain, vibration or touch, from the skin.
- **Motor nerves** control **muscle** movement.
- **Autonomic nerves** control functions such as blood pressure, **sweating**, heart rate, digestion and bladder function.

Signs and symptoms

- Numbness, prickling, or tingling in your feet or hands.
- Sharp, jabbing, throbbing or burning pain.
- Pain during activities that shouldn't cause pain, such as pain in your feet when putting weight on them or when they're under a blanket- extreme sensitivity to touch.

Signs and symptoms

- Feeling as if you're wearing gloves or socks when you're not.
- Lack of coordination and falling due to muscle weakness.
- Dryness of the skin.

What causes peripheral neuropathy?

- **Autoimmune diseases.** Sjogren's syndrome, lupus, rheumatoid arthritis, Guillain-Barre syndrome, vasculitis, some cancers related to the body's immune system.
- **Diabetes.** This is the **most common cause.** Among people with diabetes, more than half will develop some type of neuropathy.

What causes peripheral neuropathy?

- **Infections.** These include certain viral or bacterial infections, including Lyme disease, shingles, hepatitis B and C, leprosy, diphtheria, and HIV.
- **Inherited disorders.** Charcot-Marie-Tooth disease.

What causes peripheral neuropathy?

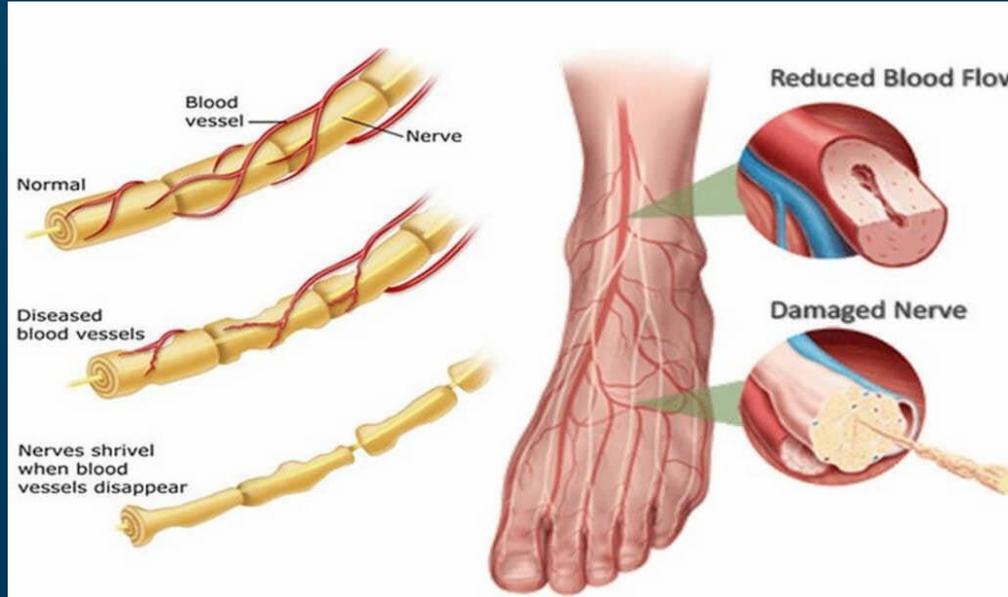
- **Tumors.** Cancerous growths and noncancerous growths can grow on or press on nerves.
- **Bone marrow disorders.** Myeloma, lymphoma, amyloidosis.
- **Other diseases.** Metabolic conditions such as kidney disease or liver disease, and hypothyroidism.

What causes peripheral neuropathy?

- **Alcoholism.**
- **Low vitamin levels.** B vitamins, including B-1, B-6 and B-12, as well as copper and vitamin E are crucial to nerve health.
- **Exposure to poisons.** Industrial chemicals and heavy metals such as lead and mercury.
- **Medicines.** Especially chemotherapy.

What causes peripheral neuropathy?

- In some cases, no cause can be identified- **idiopathic peripheral neuropathy**



Complications from peripheral neuropathy

- Can get decreased sensation to temperature and pain; sensory.
- Can get decreased perspiration of the skin causing dryness; autonomic.
- Can get weakness of the muscles causing deformities of the toes and feet; motor.

Complications from peripheral neuropathy

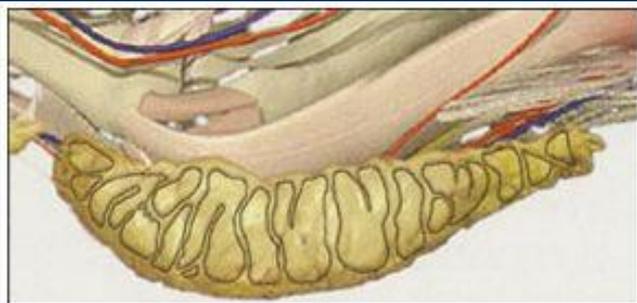
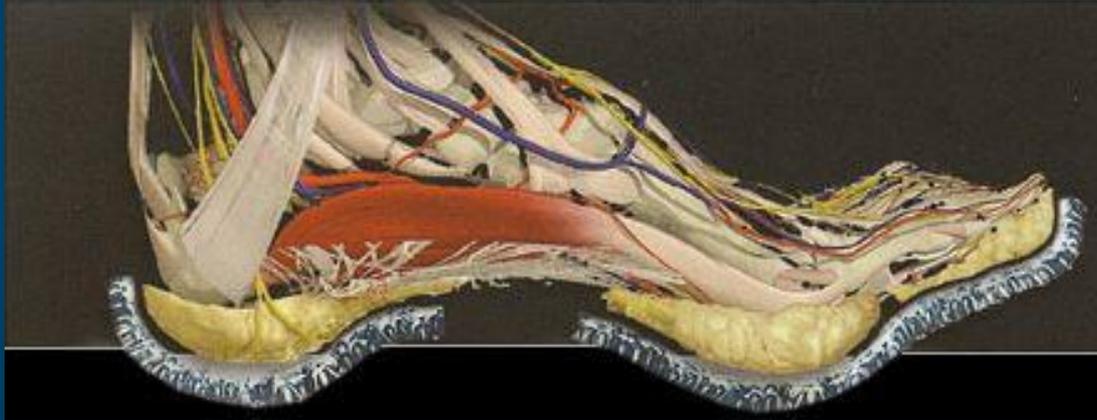
- Can range from numbness, tingling, burning sensation, to extreme pain.
- Affects balance by disrupting proprioception.
- Can develop ulcerations and infections.

Complications from peripheral neuropathy

Muscular weakness ---> toe/foot deformity --->
increased pressure ---> corn/callus formation --->
continued **undetected increase in pressure** ---> ulcer
formation ---> skin infection (cellulitis) ---> bone
infection (osteomyelitis) ---> amputation



Complications from peripheral neuropathy



Fat Pad of a 20 Year Old



Fat Pad of a 60 Year Old

Complications from peripheral neuropathy



Complications from peripheral neuropathy

- There is a sensory foot/body, foot/brain connection vital to body stability, equilibrium and gait.
- The soles and tips of the toes contain **over 200,000 nerve endings**; perhaps the densest concentration in the body.
- Our nerve-dense soles are our only contact with the physical world around us.



Complications from peripheral neuropathy

- Tactile sensitivity in the hand declines very little and we use it to supplement plantar sensations.

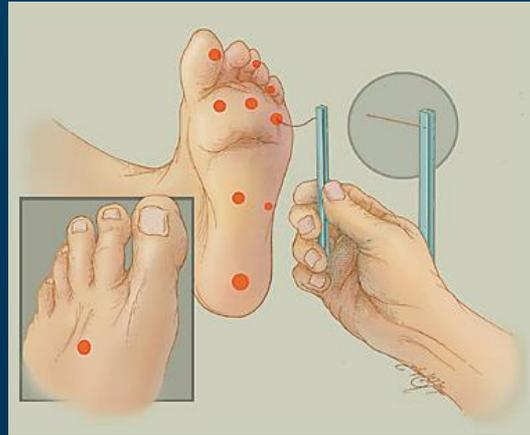


How to detect peripheral neuropathy



Semmes-Weinstein Monofilament Evaluation

- A 5.07 gauge monofilament, using 10 gms of force, is used to measure **protective sensation**.
- Studies have shown that if you cannot feel this filament there's a 18% greater chance for ulcer development.



Vibratory Sensation Testing

- By use of this tuning fork we check the loss of **vibratory sensation**.
- Studies have shown that it is five times more predictive of neuropathy than the monofilament exam.



Electromyograph (EMG)/ Nerve Conduction Study (NCS)

- Small metal wires are placed on your skin that release tiny electric shocks to stimulate your nerves; the speed and strength of the nerve signal is measured.



How to detect peripheral neuropathy

- Problem with EMG/NCS- really tests large nerve fibers.



Epidermal Nerve Fiber Density (ENFD) Testing

- Has been used since the 90's to qualify and quantify small fiber peripheral neuropathy.
- Provides a definitive diagnosis and determines the degree of severity (normal, mild, moderate, severe).
- Is highly sensitive and specific for small fiber peripheral neuropathy.



Normal	Mild	Moderate	Severe
Above 7.1 fibers/mm	Between 3.8-7.1 fibers/mm	Less than 3.8 fibers/mm	Less than 2.0 fibers/mm

What to do about peripheral neuropathy

- “Garnish helpin”- nothing helps?

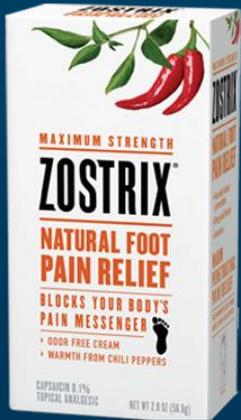


What to do about peripheral neuropathy

- Eat a diet rich in **fruits, vegetables, whole grains** and **lean protein** to keep nerves healthy.
- **Exercise** regularly- means at least 30 mins a day.
- **Dietary supplements** may help:
 - Alpha lipoic acid- 350 mg
 - Benfotiamine- 300 mg
 - Vitamin B6- activated form, 35 mg
 - Vitamin B12- activated form, 2 mg

What to do about peripheral neuropathy

- **Topical medications:**
 - Biofreeze gel, Icy Hot cream
 - Creams with salicylates- Bengay, Aperc cream, Flexall, Salonpas
 - Neuro One peripheral neuropathy nerve support cream; contains L-arginine
 - Creams with capsaicin derived from cayenne peppers- Zostrix; blocks substance P
 - Lidocaine patch



What to do about peripheral neuropathy

- **Topical medications:**
 - Qutenza- 8% capsaicin topical system applied for 60 mins once every 3 months. Can cost close to \$4,000 and is only 40% effective.

NDC 72512-930-01

Four single-use topical systems (179 mg capsaicin)
Three single-use 50 g tubes of Cleansing Gel

4 Qutenza®

(capsaicin) 8% topical system

R_{only}. For topical use only.
Dosage/Instructions for Use: See Full Prescribing Information.
Only a healthcare professional should open the QUTENZA carton or pouch.
Use of nitrile gloves is required when handling QUTENZA. Do not use latex gloves.
QUTENZA contains capsaicin and may cause irritation.
QUTENZA should be administered by a physician or healthcare professional under the close supervision of a physician.

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For questions about QUTENZA, call 1-877-900-6479. Rev. Nov 2020



What to do about peripheral neuropathy

- **Oral medications:**
 - Pregabalin, Gabapentin, Amitriptyline (antidepressant), Tramadol (opioid)



What to do about peripheral neuropathy

- **Anodyne Infrared Therapy**



What to do about peripheral neuropathy

- **Anodyne Infrared Therapy:**
 - Device delivers **M.I.R.E.:**
 - **M**onochromatic light of 890 nm wavelength
 - **I**nvisible to the naked eye
 - **R**ed Blood Cells (RBC's) absorb, and penetrates 5 cm
 - **E**mits energy of 6240mw with a pulse rate of 292hz
 - The key to is that the energy causes the RBC's to release **Nitric Oxide.**

What to do about peripheral neuropathy

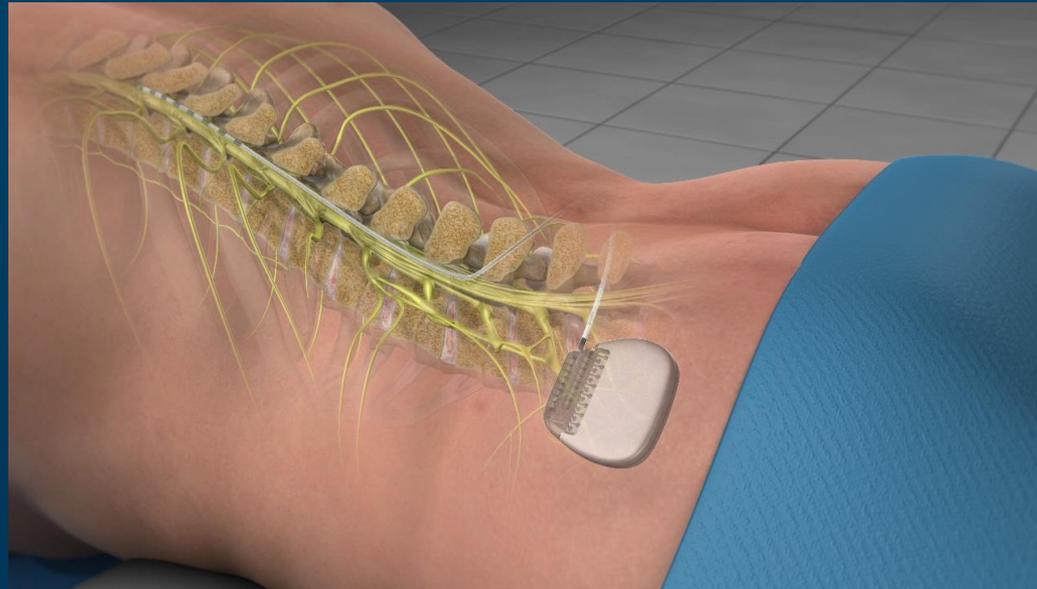
- **Anodyne Infrared Therapy:**

- **Nitric Oxide** causes:

- arteries, vein, and capillaries to increase blood flow
- promotes new blood vessel growth
- reduces platelet aggregation
- counteracts the effects of high glucose and cholesterol on blood vessels
- directly mediates a pain relieving effect
- indirectly reduces ischemia (decreased oxygen from reduced blood flow)
- increases nutrients and reduces inflammation to the nerves

What to do about peripheral neuropathy

- **Nerve Stimulators**
- **Spinal Cord Stimulation**



What to do about peripheral neuropathy

- Be careful about the claims made by some products!

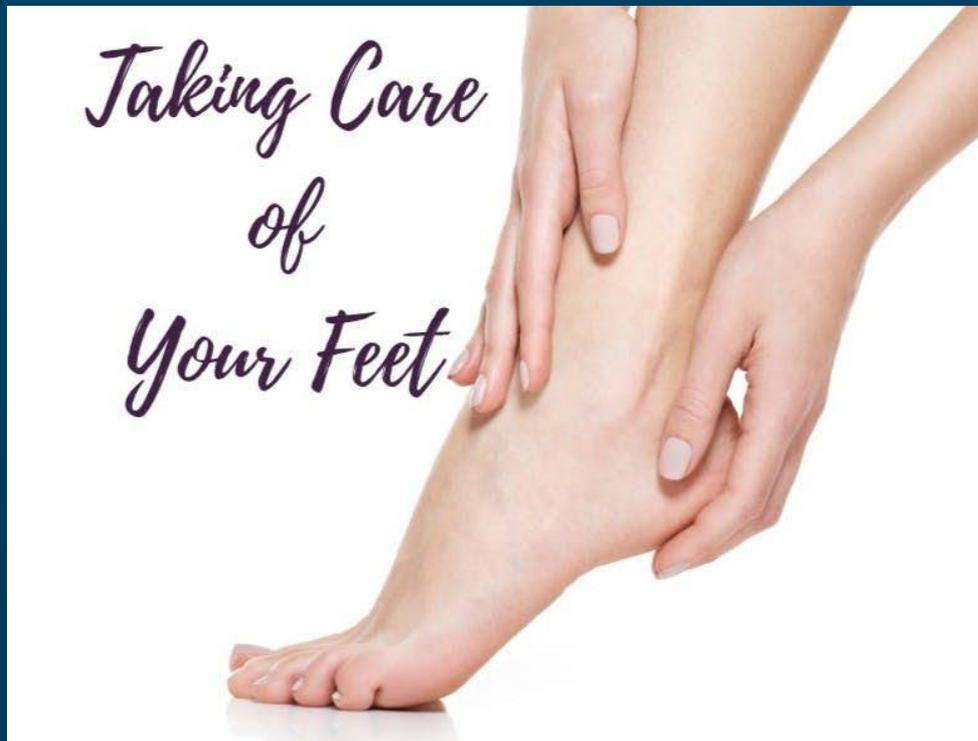
This New Breakthrough Technology Fixes Blood Circulation Issues and Reverses Neuropathy in Mere Weeks



Dr. Jeremy partnered up with a med tech startup Nooro to create the first massager that uses **NeuroMuscular Electrical Stimulation technology**.

This technology sends a unique combination of targeted electric impulses deep into the tissue of feet and instantly kickstarts blood circulation...

What to do about peripheral neuropathy



What to do about peripheral neuropathy

- Examine your feet daily; use a mirror so you can see the bottom of your feet.
- Examine between the toes.
- Check for any bad odor.
- Check inside your footwear before putting them on.



What to do about peripheral neuropathy

- Wash your feet daily. Then dry your feet well, especially between the toes.
- Keep the skin soft and smooth with cream.
- If your feet are at low risk for problems, gently use a pumice stone to smooth corns and calluses.
- Don't use over-the-counter products or sharp objects on corns or calluses.
- Wear properly fitting footwear.

What to do about peripheral neuropathy

- **If you can see and reach** your toenails, and you are **not at high risk**, trim them straight across and file the edges with an emery board or nail file.
- If your feet are at high risk for problems, it's important that you always wear shoes **and** socks. In other words, **never walk barefoot.**





**Thank you for your kind
attention.
Take care and God bless.**