

# 2024 PN Summer education Series

WEBINARS | JULY 9 | JULY 12 | JULY 17 | JULY 25 | JULY 31 | AUG 1

Thank you for joining us! *We will begin shortly.*

the Foundation for Peripheral Neuropathy | [FoundationForPN.org](https://FoundationForPN.org)

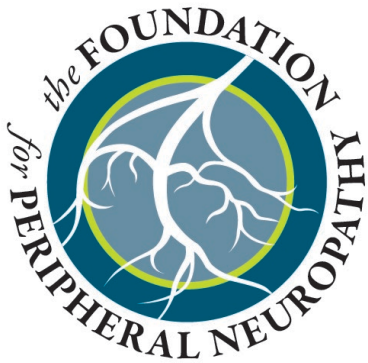
# *Living Well with* Peripheral Neuropathy: Enhancing Quality of Life

Thank you for joining us!



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**Moderator:**  
**April Hubert**  
*Director of Development and External Affairs  
the Foundation for Peripheral Neuropathy*



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# Before We Begin



This presentation is being recorded. The recording link will be emailed to you and posted on the FPN website in the coming days.



Submit your questions anytime via the Questions Box. We will try to answer as many as we can.



Audio issues? You can dial in by phone (check your email for dial-in instructions).



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**Today's Presenters:**



**Shanna Patterson**  
*Neurologist*  
Mt. Sinai Health System



**Lisa Osowski**  
*Clinical Dietician*  
Advocate Health Care



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# Living Well With Peripheral Neuropathy

Shanna Patterson, MD, MS

July 2024



*the* FOUNDATION *for*  
PERIPHERAL NEUROPATHY®



Mount  
Sinai

**Optimizing Daily Living**  
*A Thoughtful Response to Symptoms*

## Defining Neuropathy



*the* FOUNDATION *for*  
PERIPHERAL NEUROPATHY®

**Peripheral neuropathy** occurs when peripheral nerve(s) is/are damaged. The message coming from the periphery (sensation) and going towards the brain can be altered: in this case sensory loss or pain can be present. If the message cannot go from the brain to the periphery (e.g., muscles) weakness will be there. Moreover, as stated above, some components of the PNS are responsible for involuntary functions (e.g., sweating, bowel movements, ...); these functions might be altered too.

Peripheral Neuropathy is not a single disease. It's a general term for a series of disorders that result from damage to the body's peripheral nervous system.

Peripheral neuropathy can affect multiple nerves (polyneuropathy) or only one nerve (mononeuropathy) or nerve group (multiple mononeuropathies) at a time.

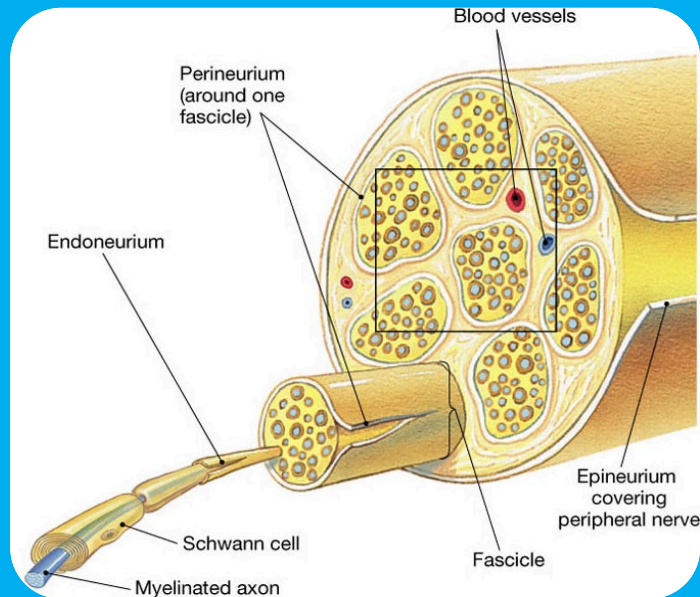




# Neuropathy

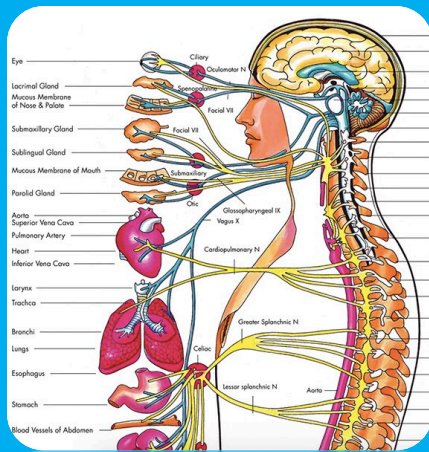
- One of the most prevalent neurologic conditions encountered by physicians of all specialties
- Prevalence:
  - 2.4% in the general population
  - 8% over age 55

# Peripheral Nerve Anatomy & Neuropathy Symptoms



- Motor
  - Weakness
  - Balance
- Sensory
  - Numbness
  - Pain
  - Balance

# Peripheral Nerve Anatomy: Autonomic Nervous System



- Autonomic symptoms frequently underreported
  - Cardiovascular (orthostatic hypotension)
  - GI (constipation, nausea or diarrhea)
  - Urogenital (neurogenic bladder or erectile dysfunction)
  - Secretomotor (sweating)

Med Clin N Am 103 (2019) 383–397

<https://www.dyansys.com/products-applications/product-technology/ans-monitor-technology>

# Managing Pain and Discomfort

# Supplements in Prevention and Treatment of Peripheral Neuropathy

## ALPHA LIPOIC ACID

Has been studied for treatment of *diabetic neuropathy*

Anti-inflammatory effects, reduces oxidative stress

Several studies show **improvement in neuropathy symptoms** with long term use

According to one study taking 600mg orally each day provides optimal risk-to-benefit ratio

## ACETYL-L-CARNITINE

Shown in clinical trials to be effective for *diabetic neuropathy*

In studies of chronic PN patients treated with 500-1,000mg 3x day showed **improvements in pain, improved sensation**

Studies of other types of neuropathy have shown mixed results

## VITAMIN D

Studies have identified vitamin D deficiency as a risk factor for *diabetic neuropathy*

Several trials showed **improved pain** in patients with diabetic neuropathy, one study used dose of 50,000IU/week

Benefit of supplementation is less clear for patients with neuropathy and normal vitamin D levels

# Supplements in Prevention and Treatment of Peripheral Neuropathy

## Vitamin B1

Studies have shown diabetic patients are more vulnerable to vitamin B1 deficiency

Vitamin B1 deficiency can cause peripheral neuropathy

Taking vitamin B1 600mg/day **can help improve pain** in patients with diabetic neuropathy

## Vitamin B12

Vitamin B12 deficiency can cause neuropathy

Vitamin B12 deficiency is not uncommon in the USA, particular in older individuals when absorption declines

In one study of patients with diabetic neuropathy and *normal* B12 levels, taking vitamin B12 500mg 3 times daily **helped improve symptoms of neuropathy** after 4 months



# Pharmacologic Neuropathic Pain Treatment

Anticonvulsants	Antidepressants	Topicals
gabapentin	duloxetine	lidocaine (5%) patch
pregabalin	amitriptyline	capsaicin (8%) patch

Mayo Clin Proc. 2015;90(7):940-951



# Integrative Therapy use by Peripheral Neuropathy Patients

## 2004 survey of 180 outpatients with peripheral neuropathy:

43% used complementary and alternative medicine, most frequently for pain control

35% megavitamins

30% magnets

30% acupuncture

22% herbal remedies

21% chiropractic manipulation

*27% thought their neuropathy improved*



# Sleeping with Neuropathy

# Optimizing Sleep when Living with Neuropathy

Sleep deficiency adversely impacts pain

Sleep hygiene can play a key role in management of painful neuropathy symptoms:

- Use pain interventions in advance of bedtime
- Consistent sleep and wake times
- Timing of caffeine and alcohol consumption
- Exercise in the mornings (later in day -> stimulating)
- Cool temperature, calm environment, avoid screens
- Local treatments to alleviate pain can assist in falling asleep: foot rub, foot bath, heavy socks, topical ointments

[Neuropsychopharmacology](#), 2020 Jan; 45(1): 205–216.

Published online 2019 Jun 17. doi: [10.1038/s41386-019-0439-z](https://doi.org/10.1038/s41386-019-0439-z)

PMCID: PMC6879497

PMID: [31207606](https://pubmed.ncbi.nlm.nih.gov/31207606/)

Sleep deficiency and chronic pain: potential underlying mechanisms and clinical implications

[Monika Haack](#)<sup>1,2</sup>, [Norah Simpson](#)<sup>3</sup>, [Navil Sethna](#)<sup>2,4</sup>, [Satvinder Kaur](#)<sup>1,2</sup> and [Janet Mullington](#)<sup>1,2</sup>

[▶ Author information](#) ▶ [Article notes](#) ▶ [Copyright and License information](#) [PMC Disclaimer](#)

# Revisiting Your Living Space & Habits

# Safety and Convenience – Living with Neuropathy

- Turn on lights when getting up to go to the bathroom at night
- If dizzy, stand up/sit up slowly
- Handrails in shower
- Grip holders on keys, pens, if needed
- Comfortable, supportive shoes with good traction
- Don't underestimate the freedom that can come with an assistive device (cane, walker)

# Psychological Approaches and Wellbeing

# Mind-Body Therapy

- Biofeedback may help improve diabetes control, muscle tension and anxiety
- Importance of working with somebody familiar with teaching biofeedback techniques
  - Treatments may include guided imagery sessions or relaxation techniques
  - Patients wear a device that monitors and shows them their BP, pulse and other measurements to reinforce how emotion, pain and stress influences their body

## Mindfulness

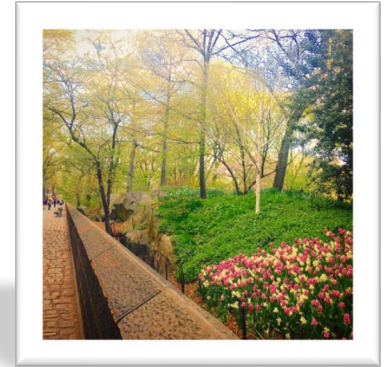
*Fostering a mindset of acceptance, doing the best we can, and being mindful of how our personal narrative of illness/neuropathy can have a significant impact.*





**“Never let the things you cannot do prevent you from doing the things you can.”**

**~Coach John Wooden**



**In cases when neuropathy is not curable, when treatment response takes time, focusing on managing symptoms is key.**



# Exercise and Physical Activity

*A response to weakness and imbalance with neuropathy, and important in and of itself*

# Why is Exercise Important?

## Preventing Neuropathy – Maintaining a Healthy Body Weight

### What is metabolic syndrome?

- Metabolic syndrome is a collection of symptoms that often occur together and increase your risk of diabetes, stroke and heart disease. The main components include obesity, high blood pressure, high triglycerides, low HDL (“good cholesterol”) and insulin resistance.
- A person’s weight is a major cause of metabolic syndrome. *Abdominal fat cells can raise levels of free fatty acids, which can raise other chemical and hormone levels in a way that affects the way your body controls blood sugar levels.*
- *Studies have shown a higher risk of neuropathy in the setting of obesity, even in the absence of diabetes or pre-diabetes.*
- *There appears to be an interplay between lipid and calcium signaling and inflammation.*

### Original Investigation

December 2016

## Association Between Metabolic Syndrome Components and Polyneuropathy in an Obese Population

Brian C. Callaghan, MD, MS<sup>1</sup>; Rong Xia, MS<sup>2</sup>; Evan Reynolds, MS<sup>2</sup>; [et al](#)

[» Author Affiliations](#) | [Article Information](#)

*JAMA Neurol.* 2016;73(12):1468-1476. doi:10.1001/jamaneurol.2016.3745

## Preventing & Managing Neuropathy Lifestyle – Physical Activity



The screenshot shows the top portion of a CDC website page. At the top left is the CDC logo with the text "Centers for Disease Control and Prevention" and "CDC 24/7: Saving Lives. Protecting People™". To the right is a search bar with the word "Search" inside. Below the logo is a dark blue navigation bar with the text "Healthy Weight, Nutrition, and Physical Activity". Underneath this bar is a breadcrumb trail: "CDC > Healthy Weight, Nutrition, and Physical Activity". At the bottom left is a home icon followed by the text "Healthy Weight, Nutrition, and Physical Activity". The main heading of the page is "Physical Activity for a Healthy Weight".

Most weight loss comes from reducing caloric activity

Maintaining a current weight requires physical activity.

CDC recommends 150 minutes of moderate intensity aerobic exercise per week (could include 30 minute brisk walks 5 days a week).

Other benefits of regular physical activity: improved sleep, reduced risk of diabetes, high blood pressure and stroke, reduced arthritis, reduced osteoporosis, reduced depression and anxiety.

# Exercise & Physical Activity

## Nutrition and exercise for diabetic neuropathy

- Maintaining close to normal glucose may reduce the incidence of diabetic neuropathy by up to 64%
  - Eating whole foods, low-fat, high-fiber, plant-based diet
  - Exercise: walking 30 minutes 3-7 days/week

## Yoga

- A variety of trials have shown benefits including: improvements in diabetes, reduced BMI, reduced lipid concentrations, reduced BP, increased energy, improved well-being
- One study showed some improvement in nerve conduction velocities after doing 30-40 minutes of daily yoga for 40 days in diabetic neuropathy patients

# Exercise & Physical Activity

## Tai Chi

- regular practice for months can improve walking, balance, strength, foot sensation, diabetic control and nerve conduction velocities
- Tai Chi is also a safe form of exercise for patients with peripheral neuropathy

**For balance and strength, PT may be important**



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Sinai**

# Peripheral Neuropathy

## Nutritional Considerations

### 1. Essential Nutrients

- B1, B6, B12, Vit D, Magnesium

### 2. Dietary Recommendations

- Balanced Diet, Manage Blood Sugar, Omega 3 Fatty Acids, Hydration, Limit Alcohol

# Essential Nutrients

- B1 (Thiamine)
- Current daily value 1.2 mg

Important for nerve function.

Deficiency can lead to neuropathy.

**Sources:** flax seeds, whole grains, sunflower seeds, legumes



1 oz 0.473 mg (39% DV)

- B6 (Pyridoxine)
- Current daily value 1.7 mg

Helps maintain healthy nerve function.

Deficiency can lead to neuropathy.

**Sources:** Fish, poultry, potatoes, chickpeas, and bananas



6 oz: 1.6mg  
(94% DV)



# Essential Nutrients

- B12 (Cobalamin)
- Current daily value 2.4 mcg

Crucial for nerve health and red blood cell production.

Deficiency can cause neuropathy.

**Sources:** Liver, beef, dairy products, fortified cereals and nutritional yeast.

**Note:** Vegans and older adults may need supplements



1/4c 24 mcg  
(1000% DV)

# Nutritional supplement deep dive

- B12 (Cobalamin) Current daily value 2.4 mcg

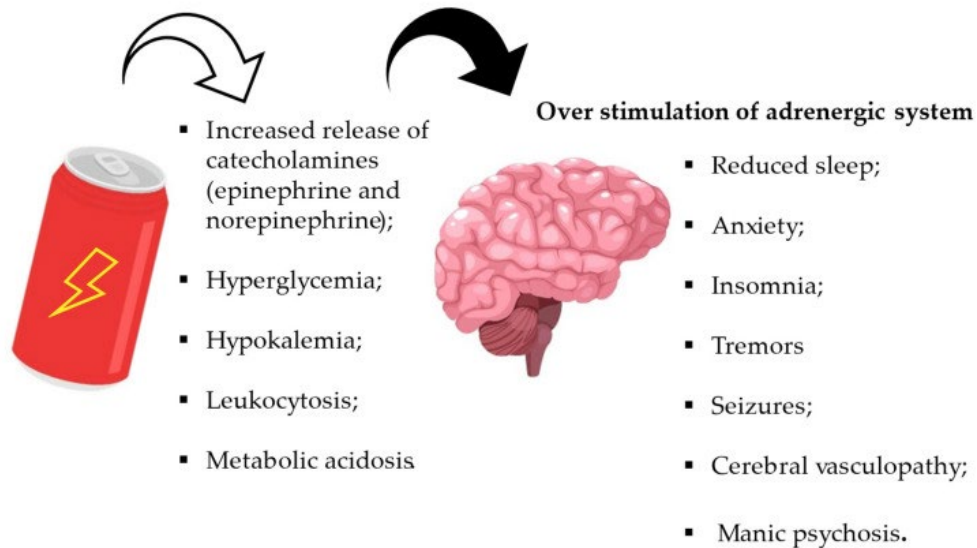


Supplement Facts		
Serving Size 8.0 fl.oz. (240 mL)		
Serving Per Container: 2		
Amount Per Serving	% Daily Value	
<b>Calories</b>	100	
<b>Total Carb</b>	27g	9%*
Sugars	27g	†
Riboflavin	1.7mg	100%
Niacin	20mg	100%
Vitamin B6	2mg	100%
Vitamin B12	6mcg	100%
Sodium	180mg	8%
Taurine	1000mg	†
Panax Ginseng	200mg	†
Energy Blend	2500mg	†
L-Carnitine, Glucose, Caffeine, Guarana, Inositol, Glucuronolactone, Maltodextrin		
*Percent Daily Values are based on a 2000 calorie diet. †Daily Value not established.		

1 can | 16oz  
12 mcg (500% DV)

# Nutritional supplement deep dive

The Dark Side of Energy Drinks: A Comprehensive Review of Their Impact on the Human Body [Nutrients](#). 2023 Sep; 15(18): 3922.



# Essential Nutrients

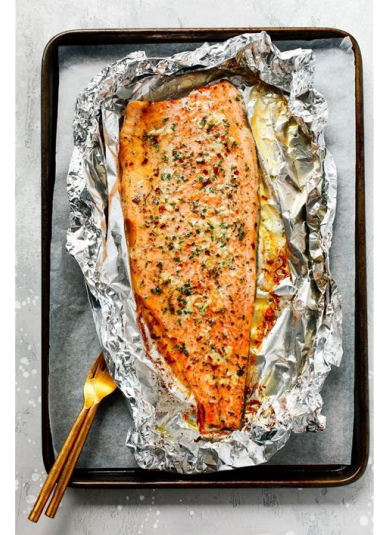
- Vitamin D
  - Current daily value 20 mcg | 800 IU
- Important for nerve health and overall immune function.  
**Sources:** Sunlight exposure, fortified foods, fish, and supplements

Note: Many people require daily supplementation.

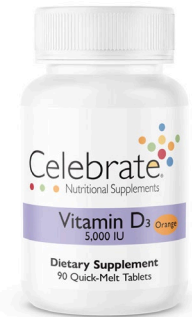
Comparison of the Effect of Daily Vitamin D2 and Vitamin D3 Supplementation on Serum 25-Hydroxyvitamin D Concentration and Importance of BMI: Systematic Review and Meta-Analysis  
[Adv Nutr.](#) 2024 Jan; 15(1): 100133.

D2: yeast, mushrooms

D3: egg yolks



3 oz 16 mcg | 645 IU  
(80% DV)



# Essential Nutrients

- Magnesium
- Current daily value 420 mg

Supports nerve function and reduces muscle cramps associated with neuropathy.

**Sources:** Seeds, nuts, legumes, whole grains

Magnesium Citrate: laxative

Magnesium Glycinate: sleep

Magnesium Promotes the Regeneration of the Peripheral Nerve

[Front Cell Dev Biol.](#) 2021; 9: 717854

High magnesium supplementation

High magnesium diet



**Pumpkin seeds** 1 oz = 150 mg  
(36% DV)

# Dietary Recommendations

- Balanced Diet
- Manage Blood Sugar

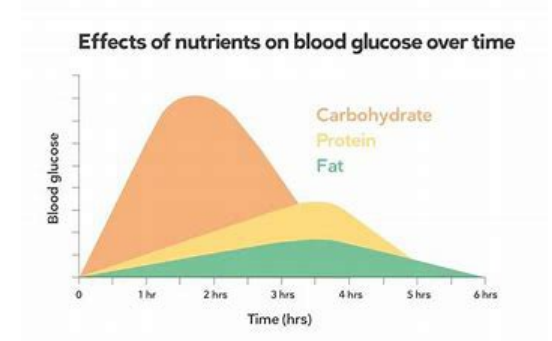
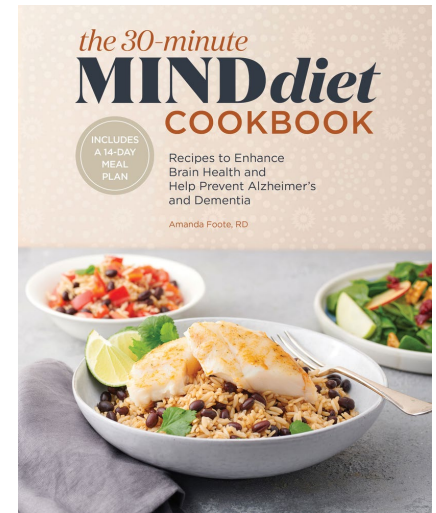
Important for nourished brain and nervous system.

## Sources:

**MIND:** Mediterranean-DASH Intervention for Neurodegenerative Delay

**DASH:** Dietary Approaches to Stop Hypertension

**Mediterranean:** Plant based, unprocessed grains, legumes, vegetables and olives. Moderate fish, yogurt, cheese.



# Dietary Recommendations

- Omega 3 Fatty Acids (PUFAs) alpha-linolenic acid (ALA), eicosatetraenoic acid (EPA), and docosahexaenoic acid (DHA)

Important for the development and maintenance of healthy nerves.

## **Sources:**

**ALA: Flax seeds, soy beans, canola oil**

**EPA & DHA: microalgae, krill oil, fish, fish oil**

Omega-3 polyunsaturated fatty acid supplementation for improving peripheral nerve health: protocol for a systematic review

BMJ 2018 Mar 25;8(3):e020804.

# Dietary Recommendations

**Table 1: Adequate Intakes (AIs) for Omega-3s [5]**

Age	Male	Female	Pregnancy	Lactation
Birth to 6 months*	0.5 g	0.5 g		
7–12 months*	0.5 g	0.5 g		
1–3 years**	0.7 g	0.7 g		
4–8 years**	0.9 g	0.9 g		
9–13 years**	1.2 g	1.0 g		
14–18 years**	1.6 g	1.1 g	1.4 g	1.3 g
19–50 years**	1.6 g	1.1 g	1.4 g	1.3 g
51+ years**	1.6 g	1.1 g		

\*As total omega-3s

\*\*As ALA

Food	Grams per serving		
	ALA	DHA	EPA
Flaxseed oil, 1 tbsp	7.26		
Chia seeds, 1 ounce	5.06		
English walnuts, 1 ounce	2.57		
Flaxseed, whole, 1 tbsp	2.35		
Salmon, Atlantic, farmed, cooked, 3 ounces		1.24	0.59
Salmon, Atlantic, wild, cooked, 3 ounces		1.22	0.35
Herring, Atlantic, cooked, 3 ounces*		0.94	0.77
Canola oil, 1 tbsp	1.28		
Sardines, canned in tomato sauce, drained, 3 ounces*		0.74	0.45
Mackerel, Atlantic, cooked, 3 ounces*		0.59	0.43
Salmon, pink, canned, drained, 3 ounces*	0.04	0.63	0.28
Soybean oil, 1 tbsp	0.92		
Trout, rainbow, wild, cooked, 3 ounces		0.44	0.40
Black walnuts, 1 ounce	0.76		



# Supplement Quality



# Dietary Recommendations

- Euhydration is the state of being in water balance.

Important for modulating toxin exposure, medication side effects, and vitamin deficiencies/toxicities which can damage the peripheral nervous system.



Peripheral Neuropathy Due to Vitamin Deficiency, Toxins, and Medications

[Continuum \(Minneapolis, Minn.\)](#). 2014 Oct; 20(5 Peripheral Nervous System Disorders): 1293–1306

System Involvement	Toxicity or Deficiency
<b>Central nervous system</b>	
Cognitive	Vitamin B <sub>12</sub> deficiency, niacin deficiency (pellagra), thiamine (vitamin B <sub>1</sub> ) deficiency (Wernicke-Korsakoff syndrome), lead toxicity, arsenic toxicity, mercury toxicity, disulfiram toxicity
Cerebellum	Vitamin E deficiency, mercury toxicity
Corticospinal	Vitamin B <sub>12</sub> deficiency, copper deficiency
Posterior column	Vitamin B <sub>12</sub> deficiency, copper deficiency
<b>Integument</b>	
Skin	Thiamine deficiency (beriberi), lead toxicity, arsenic toxicity (alopecia), thallium toxicity (alopecia)
Nails	Arsenic toxicity (Mees lines), thallium toxicity (Mees lines)
<b>Musculoskeletal</b>	
Muscle	Vitamin E deficiency (myopathy)

# Dietary Recommendations

- Limit Alcohol

The prevalence of peripheral neuropathy among chronic alcohol abusers is 46.3%



Clinical Institute Withdrawal Assessment [CIWA] Protocol

Thiamine 100 mg IM

Thiamine 100 mg orally, BID x 3 days

Wernicke Encephalopathy

Thiamine  $\geq$  500 mg IM, TID x  $\geq$  3 days

Diet and Nutrition in Neurological Disorders 2023, Chapter 39

The prevalence of peripheral neuropathy among chronic alcohol abusers is 46.3% (CI 35.7%–57.3%)

# Questions?

**Lisa Osowski MS, RD, CSO, LDN**  
*Registered Dietitian*

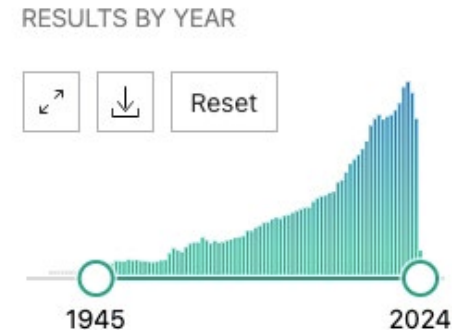
Health Management Center  
Advocate Good Shepherd Hospital  
450 West Highway 22  
Barrington, IL 60010  
O: 847.842.4460



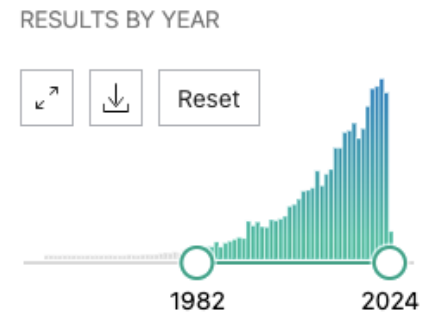
# Hope for the Future

# Increased Research on PN and Prevention of Peripheral Neuropathy

PubMed search results for Peripheral Neuropathy by Year



PubMed search results for **Prevention of** Peripheral Neuropathy by Year



## The Brain Health Imperative in the 21st Century —A Call to Action

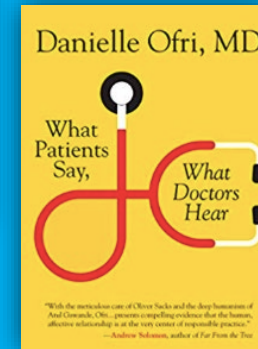
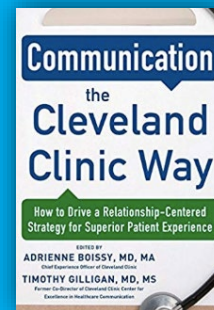
Natalia S. Rost, MD, MPH, Joel Salinas, MD, MBA, MSc , Justin T. Jordan, MD MPH, Brenda Banwell, MD, Daniel J. Correa, MD , Rana R. Said, MD, Linda M. Selwa, MD , Sarah Song, MD, MPH, and David A. Evans, MBA for the American Academy of Neurology's Committee on Public Engagement | [AUTHORS INFO & AFFILIATIONS](#)



Brain health is a continuous state of attaining and maintaining the optimal neurologic function that best supports one's physical, mental, and social well-being through every stage of life.

<https://www.brainandlife.org/brainhealth>

# The importance of physician-patient communication

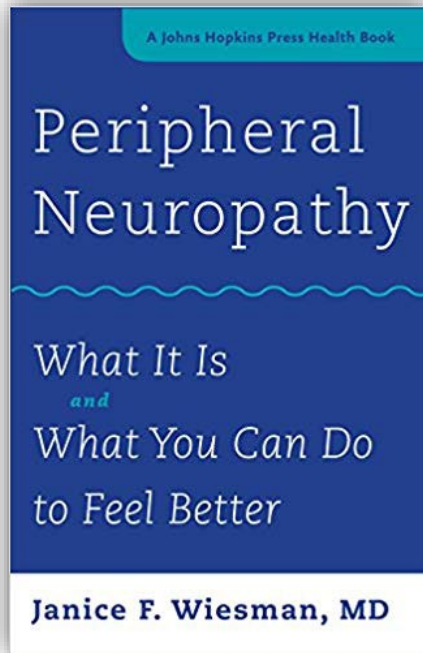


1. The problem: “I can do nothing for you”
2. The solution: communication, continuity of care

Med Care. 2009 Aug; 47(8): 826–834.  
Boissy et al.: Physician Communication Training Improves



# Increasing Resources for Patients





# Thank You

I am sincerely grateful to my greatest teachers,  
my patients, and to *the* Foundation *for* Peripheral  
Neuropathy

# Questions?



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*Please consider a \$25 donation to fund this series and future programming.*



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*next up*

Empower Your Voice:  
**Advocating for Peripheral Neuropathy**

**Did you like this webinar?** Please take our survey at the end of this webinar. A recording will be uploaded on our website at [FoundationForPN.org](https://FoundationForPN.org) shortly.

**Support FPN!** If you have not already, please consider making a \$25 gift to help fulfill our mission of improving the lives of those with peripheral neuropathy. Give securely using the QR code:

**Anything else?** 847-883-9942 [info@tffpn.org](mailto:info@tffpn.org)  
485 E. Half Day Road, Suite 350, Buffalo Grove, Illinois 60089.



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# Don't forget to tune in:

Thursday, August 1, 11am CT | 12pm ET: **Empower Your Voice:  
Advocating for Peripheral Neuropathy**



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