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Photobiomodulation (PBM) for Foot Neuropathy: Evidence and Protocols

What is Photobiomodulation?

Photobiomodulation (also known as low-level laser therapy or LED therapy) uses red to near-infrared light to stimulate cellular energy (ATP), enhance blood flow via nitric oxide release, reduce oxidative stress, and regulate inflammation.

When light is applied to the skin, it is absorbed by the cells' energy factories called mitochondria. This boosts the production of ATP, which is the energy currency cells need to function and repair themselves. PBM also increases blood flow by releasing nitric oxide, a natural molecule that helps open up blood vessels. This can reduce swelling, speed up tissue repair, and lower nerve-related pain.

Think of PBM as 'fuel for your cells'—helping damaged or inflamed tissues recover more quickly and restoring balance in areas affected by poor circulation or nerve damage. It's painless, drug-free, and supported by hundreds of scientific studies.

Clinical Benefits for Foot Neuropathy

1. 1. Diabetic Peripheral Neuropathy (DPN)

- A meta-analysis protocol shows promise for PBM relieving neuropathic pain and improving nerve conduction in DPN patients. [Frontiers 2024]

- A single-blind RCT reported significant pain reduction and quality-of-life improvement in DPN patients. [PubMed 2025]

2. 2. Chemotherapy-Induced Peripheral Neuropathy (CIPN)

- A crossover RCT with 70 patients found a ~50% reduction in mTNS scores after PBM. [PubMed 2017]

- The NEUROLASER pilot trial showed prevention of CIPN and better QoL. [PubMed 2022]

Mechanistic Evidence

Animal models using PBM showed decreased hyperalgesia and inflammatory markers in diabetic neuropathy. [Nature Sci Rep 2022]

Summary Table

Condition	Evidence Level	Outcomes
Diabetic neuropathy	RCTs & meta-analyses	↓ pain, ↑ nerve conduction, ↑ QoL
Chemotherapy neuropathy	RCT crossover & pilot	~50% mTNS reduction, prevention of CIPN
Animal studies	Mechanistic (rats)	↓ hyperalgesia, ↓ pro-inflammatory markers

Suggested Protocols: SPRB & GRPB

1. SPRB – for smaller and more localized areas of the foot

- Wavelength: 660 nm (red) 50% and Near-Infrared (850) 50%
- Delivery method: Direct application of belt on the skin over the affected area
- Treatment area: Multiple spots along foot sole and toes can be treated at once
- Session duration: 15 minutes per session and if acute pain then 2x per session for total treatment time of 30 minutes
- Frequency: 3× per day for one week and then as need 3-5 x per week for maintenance
- Rationale: Red light activates mitochondrial cytochrome c oxidase at superficial depths, enhancing microcirculation and cellular repair.

2. GRPB – the entire foot can be covered

- Wavelengths: 660 nm (red) 1/3 and Near-Infrared (850) 2/3 for deeper penetration
- Delivery: Due to the larger size of the GPRB the belt can be wrapped around the foot with the straps creating a boot so there is enhanced light therapy delivered completely around the foot
- Session duration: 15 minutes

- Frequency: 1 -3 x Daily
- Rationale: Near-infrared targets deeper tissue; and enhances anti-inflammatory effects in capillary-rich foot tissue. [Clinical Trial]

***To enhance the effect of light for systemic effects either the SPRB or GRPB can be applied/wrapped above the ankle and leg in addition to the localized application over the affected area. ***

The same session duration and frequency can be used when this systemic application is being done. ***

📌 Monitoring & Safety Tips

- Monitor the amount of heat generated with the device. If the device heats up please allow 30 minutes between applications
- PBM is non-invasive and well-tolerated, with no serious adverse effects reported.

👩‍⚕️ Next Steps

For clinic or home practitioners:
- Start with SPRB protocols for smaller localized issues
- Expand to GPRB for enhanced overall effects
- Encourage further use around the ankle to stimulate systemic blood flow and healing effects.

Conclusion

PBM demonstrates strong clinical and mechanistic evidence in treating foot neuropathy—both diabetic and chemotherapy-induced. SPRB and GRPB protocols offer accessible, evidence-based options with low risk and meaningful clinical benefit.

Illustrated is a device wrapped around diabetic foot.

Disclaimer

The information provided in this document is for educational and informational purposes only. It is not intended as a substitute for professional medical advice, diagnosis, or treatment. Individuals should always consult with a licensed physician or qualified healthcare provider before beginning any new therapy, including the use of photobiomodulation (PBM) devices.

PBM devices such as the SPRB and GPRB are wellness tools designed to support general health and well-being. They are not medical devices and are not intended to diagnose, treat, cure, or prevent any disease or medical condition. No medical claims are made or implied. Results may vary based on individual factors, and PBM should not be considered a replacement for appropriate medical care.