Photobiomodulation (PBM) and General Neuropathy:

Introduction

Neuropathy, a condition resulting from damaged peripheral nerves, manifests with symptoms such as numbness, tingling, burning pain, or muscle weakness. Photobiomodulation (PBM) therapy—using red and near-infrared light—has shown significant promise in managing various forms of neuropathy. This non-invasive, drug-free therapy supports mitochondrial function, improves blood flow, and modulates inflammation.

The PBM Healing International SPRB (Small Pain Rehab Belt) and GPRB (General Pain Rehab Belt) devices deliver clinically effective wavelengths and energy densities that align with published research. This document outlines application for general neuropathy treatment, supported by current evidence with live links.

Common Locations and Conventional Management of Neuropathy

Neuropathy most commonly affects the peripheral nerves in the feet and hands, with the feet being the most frequent site of involvement due to the longer nerve lengths and greater susceptibility to metabolic and mechanical stress. This is especially prevalent in conditions such as diabetes mellitus (diabetic peripheral neuropathy), chemotherapy-induced neuropathy, alcohol-related neuropathy, and idiopathic small fiber neuropathy.

Conventional management strategies for neuropathy include:
- Medications such as gabapentin, pregabalin, duloxetine, or tricyclic antidepressants
- Topical agents like capsaicin or lidocaine patches
- Physical therapy and occupational therapy
- Transcutaneous electrical nerve stimulation (TENS)
- Lifestyle modifications: smoking cessation, blood sugar control, nutritional support

Despite these options, many patients experience limited relief and side effects. Photobiomodulation offers a promising adjunctive approach that addresses the underlying cellular dysfunction without the systemic adverse effects of pharmacotherapy

Mechanism of Action of PBM in Neuropathy

PBM works primarily through the absorption of light photons by cytochrome c oxidase in the mitochondrial respiratory chain. This leads to:
- Increased ATP production for cellular repair
- Modulation of reactive oxygen species (ROS)
- Release of nitric oxide (NO) improving vasodilation
- Downregulation of pro-inflammatory cytokines (e.g., TNF-α, IL-1β)
- Enhanced nerve regeneration and reduction in neuropathic pain

PBM is particularly useful for neuropathies associated with diabetes, chemotherapy, injury, or idiopathic origins.

Clinical Evidence for PBM in General Neuropathy

1. Huang YY et al. (2022). PBM for peripheral neuropathy shows improvement in nerve conduction velocity and pain reduction. [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9189937/]

2. Yeh SW et al. (2019). Low-level laser therapy for treatment of peripheral neuropathy: a systematic review and meta-analysis. [https://doi.org/10.1097/MD.0000000000015560]

3. da Silva DF et al. (2020). Efficacy of PBM on peripheral nerve regeneration: a randomized controlled study. [https://doi.org/10.1016/j.jphotobiol.2020.112827]

4. Chow RT et al. (2007). PBM treatment of chronic neuropathic pain: a controlled clinical trial. [https://doi.org/10.1016/j.pain.2007.06.008]

Recommended Protocols Using SPRB and GPRB Devices

• **SPRB ** for specific smaller areas of concern
- Wavelengths: 660 nm (red) and 850 nm (near-infrared) 50:50 mix
- Application: Directly over areas with neuropathic symptoms
- Duration: 15 minutes per site up to 2 x per session
- Frequency: 1-3x/day for acute flare-ups, then 1-3 x daily/3 – 5 x per week for

maintenance
- Use case: Localized neuropathy (e.g., hands, feet, arms)

• **GPRB ** for coverage of larger areas and to provide more systemic effects than localized application alone
- Wavelengths: 660 nm and 850 nm with deeper penetration 1/3 : 2/3 mix
- Application: Wrap or lay flat over affected nerve pathways (e.g., back, legs)
- Duration: 15 minutes per session x 2 as needed
- Frequency: 1–3x/day initially until symptoms decrease and then tapering to 1x per day 3–5x/week
- Use case: Widespread neuropathy, or systemic use for diffuse pain and inflammation

***For systemic support, apply devices above and below the area of concern in addition to the localized spot application and follow same dosing recommendations**

Finger neuropathy and application of light via SPRB on wrist to stimulate systemic effects

Safety and Monitoring

PBM is widely regarded as safe, with no significant adverse effects reported in human studies. The following should be monitored:
- Ensure devices do not overheat during extended use
- Avoid use over open wounds unless specifically indicated
- No contraindications for metal implants or pacemakers

Conclusion

PBM therapy using SPRB and GPRB devices offers a clinically supported, drug-free solution for managing neuropathic pain and improving nerve function. It is accessible for both clinical and home use, with protocols adaptable to various causes and severities of neuropathy. The growing body of literature validates its role as an effective adjunct or alternative to pharmaceutical treatments.

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.

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