



## Photobiomodulation (PBM) for Upper Neck and Shoulder Pain: Evidence and Protocols

### What is Photobiomodulation?

Photobiomodulation (PBM), also known as low-level laser therapy or red light therapy, utilizes specific wavelengths of red and near-infrared light to modulate cellular function. Light energy is absorbed by mitochondria within the cells, leading to enhanced ATP production, reduction of oxidative stress, and improved microcirculation. These mechanisms support reduced inflammation and promote tissue repair—key benefits for musculoskeletal conditions like neck and shoulder pain.

PBM is non-invasive and drug-free, making it a promising therapy for pain localized in the cervical and upper thoracic regions. It is particularly beneficial for patients with chronic neck tension, trapezius strain, cervicogenic headaches, or postural strain from long-term desk work or mobile device use.



## ✓ Clinical Benefits for Neck and Shoulder Pain

### 1. Chronic Neck Pain

- A 2020 meta-analysis of 17 RCTs concluded that PBM significantly reduces pain intensity and improves function in chronic neck pain patients. [Live link](<https://pubmed.ncbi.nlm.nih.gov/32096855/>)
- An RCT published in the Journal of Clinical Medicine found that red light therapy applied to the trapezius reduced muscle stiffness and improved range of motion. [Live link](<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8505884/>)

### 2. Myofascial Pain Syndrome (MPS)

- A clinical study on 60 patients with MPS showed significant pain reduction and improved trigger point sensitivity with PBM. [Live link](<https://pubmed.ncbi.nlm.nih.gov/29734079/>)
- Another trial demonstrated that PBM led to a 40–60% reduction in pain scores after 10 sessions. [Live link](<https://pubmed.ncbi.nlm.nih.gov/28973605/>)

### 3. Cervicogenic Headaches

- PBM applied to the upper neck and occiput area reduced headache frequency and severity. [Live link](<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7402365/>)



## 🔑 Mechanistic Evidence

PBM modulates inflammatory cytokines ( $\downarrow$  TNF- $\alpha$ , IL-6) and upregulates anti-inflammatory mediators such as IL-10. It also improves mitochondrial function in muscle fibers, reducing fatigue and promoting muscle elasticity. Functional MRI studies show enhanced perfusion in the cervical spine post-PBM, indicating better tissue oxygenation and pain control. [Live link](<https://pubmed.ncbi.nlm.nih.gov/33342800/>)

## Suggested Protocols: SPRB & GRPB



1. SPRB – For localized neck spots and trapezius muscles
  - Wavelength: 660 nm (red) 50% + 850 nm (near-infrared) 50%
  - Application: Place the belt directly over areas of pain (trapezius, lateral neck, or posterior cervical spine)
  - Duration: 15 minutes per session up to 2x per session
  - Frequency: 3× daily in acute phase; 3–5× per week for maintenance or as needed
  - Benefit: Targets superficial trigger points, improves blood flow, and relieves tension knots

2. GRPB – For broader upper shoulder/neck coverage
  - Wavelengths: 660 nm (1/3) + 850 nm (2/3)
  - Application: Wrap the belt around the base of the neck and upper back (can drape over shoulders)
  - Duration: 15 minutes per session up to 2x per session
  - Frequency: 3× daily in acute phase; 3–5× per week for maintenance or as needed
  - Benefit: Ideal for systemic relief in chronic tension or postural strain cases

\*\*\*For enhanced systemic effect, an additional session can be applied to the upper thoracic spine or base of skull where occipital nerves and cervical junctions converge.\*\*\*

### Monitoring & Safety Tips

- Do not exceed recommended durations without clinical oversight.
- Allow the device to cool if excessive heat is noticed.

- PBM is safe and non-invasive with a strong safety record in both clinical and home settings.



### Conclusion

Photobiomodulation is an effective, safe, and evidence-based option for treating upper neck and shoulder pain. By targeting inflammation, increasing blood flow, and relieving muscle tension, PBM therapy via SPRB and GRPB devices can significantly improve patient outcomes. These protocols can be applied both in at home at your convenience, supporting holistic pain management for acute or chronic conditions.

### **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.