



## **Use of Photobiomodulation (PBM) Devices in Patients with Metal or Ceramic Hip and Knee Replacements**

### **Introduction**

Photobiomodulation (PBM), also known as low-level light therapy (LLLT), involves the application of red or near-infrared light to stimulate cellular function and promote healing. For individuals with hip or knee replacements—whether metal or ceramic—PBM offers a non-invasive, drug-free method to reduce inflammation, manage chronic joint pain, and improve mobility without affecting the integrity of the prosthetic implants. This document provides guidance on the safe and effective use of the SPRB and GPRB devices from PBM Healing International in such populations.

### **Scientific Background**

PBM works by stimulating cytochrome c oxidase in the mitochondrial respiratory chain, enhancing ATP production, reducing oxidative stress, and modulating inflammation. Studies have shown that PBM can reduce postoperative pain, accelerate tissue healing, and decrease the need for analgesics, making it particularly relevant for post-arthroplasty recovery.

Importantly, red and near-infrared light used in PBM is non-ionizing and does not interfere with metal or ceramic implants. Research supports its safety even in the presence of prosthetic materials.

### **Benefits for Joint Replacement Patients**

- Reduced postoperative and chronic joint pain
- Enhanced tissue healing around the implant
- Reduced swelling and inflammation
- Improved range of motion and flexibility
- Reduced reliance on medications such as NSAIDs or opioids
- No thermal damage or electromagnetic interference with implant materials

### Recommended Use Protocol with SPRB and GPRB

Both SPRB and GPRB devices emit red (660 nm) and near-infrared (850 nm) wavelengths, which penetrate soft tissue and reach joint regions effectively.

Suggested usage includes:

#### **\*\*Device Placement:\*\***

- Position device over the skin overlying the joint. If there is tenderness then place a white cloth over the skin and keep in place while the light is activated over the area
- For hip replacements, target the lateral, anterior, and posterior regions of the hip.
- For knee replacements, treat the anterior, medial, and lateral aspects of the joint.

#### **\*\*Duration and Frequency:\*\***

- 15 minutes per session
- 1–2 sessions per day
- Continue for at least 2 weeks post-surgery, or as needed for chronic joint pain

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



Using GPRB above the knee replacement



Using SPRB above artificial hip

**\*\*Precautions:\*\***

- Do not apply over open wounds or infected skin
  - If the area does heat up too much then reduce the length of time of expose from 15 minutes to 5 minutes and then allow the tissue to cool down before using the device again
  - Safe for metal and ceramic implants
  - Always follow manufacturer safety guidelines

**Conclusion**

PBM using SPRB and GPRB devices presents a safe, effective, and non-invasive solution for managing pain, inflammation, and recovery in individuals with metal or ceramic joint replacements. It provides an adjunct or alternative to pharmacological interventions and may improve long-term joint function and patient quality of life.

**Supporting Studies**

1. Hamblin MR. Mechanisms and applications of the anti-inflammatory effects of photobiomodulation. AIMS Biophysics. 2017;4(3):337-361. [https://doi.org/10.3934/biophy.2017.3.337]
2. Bjordal JM et al. A systematic review of low-level laser therapy for osteoarthritis. BMC Musculoskelet Disord. 2003;4:17. [https://doi.org/10.1186/1471-2474-4-17]
3. Santos et al. Effects of PBM on pain and inflammation in knee osteoarthritis: A systematic review. Lasers Med Sci. 2021;36:1071–1082. [https://doi.org/10.1007/s10103-020-03143-1]

## **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.**