Use of Photobiomodulation (PBM) for Clavicle Fracture with Surgical Fixation

Possible scenario's – track cyclist who has a crash and breaks his collarbone

☑ PBM Use in Patients with Wired Clavicle Fractures

PBM is considered safe and beneficial for patients recovering from clavicle fractures, even with surgical fixation such as wires or plates.

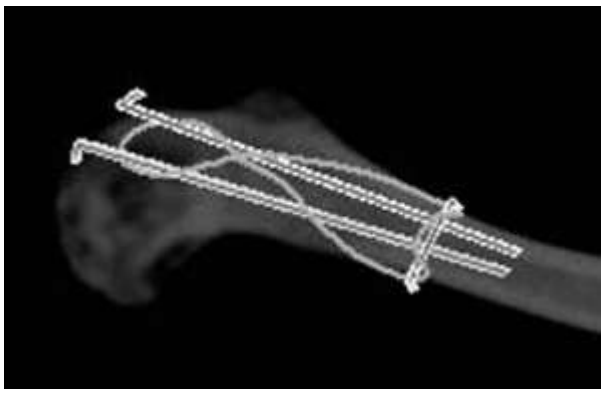

Figure 1 - Double Tension Band Wire Fixation for Unstable Fracture of the Distal Clavicle

◇ Safety Considerations

- Non-thermal & non-ionizing: PBM does not produce heat or ionizing radiation.

- No interference with metal: PBM does not interact negatively with metal implants (e.g., titanium, stainless steel).

- Minimal contraindications: There are no known adverse interactions between PBM and orthopedic implants.

Benefits of PBM for Clavicle Fracture Healing

1. Faster bone healing – Stimulates osteoblast activity and collagen synthesis.

2. Pain reduction – Reduces inflammation and modulates nociceptor activity.

3. Decreased swelling and bruising – Enhances lymphatic flow and microcirculation.

4. Improved functional recovery – Speeds up rehabilitation milestones.

PBM Application Protocol (General Guide)

Devices: SPRB or GPRB from PBM Healing

Stage	Time Post-Injury	PBM Settings	Frequency
Acute phase (0–5 days)	After surgery or trauma	15 mins per session / 4× daily	Over area of repair
Subacute phase (5–21 days)	Wound stable, less pain	15 mins per session / 2 - 3x daily	Clavicle + lymph nodes
Remodeling phase (>21 days)	Bone remodeling phase	15 mins / 1 – 2 × daily	Until full recovery

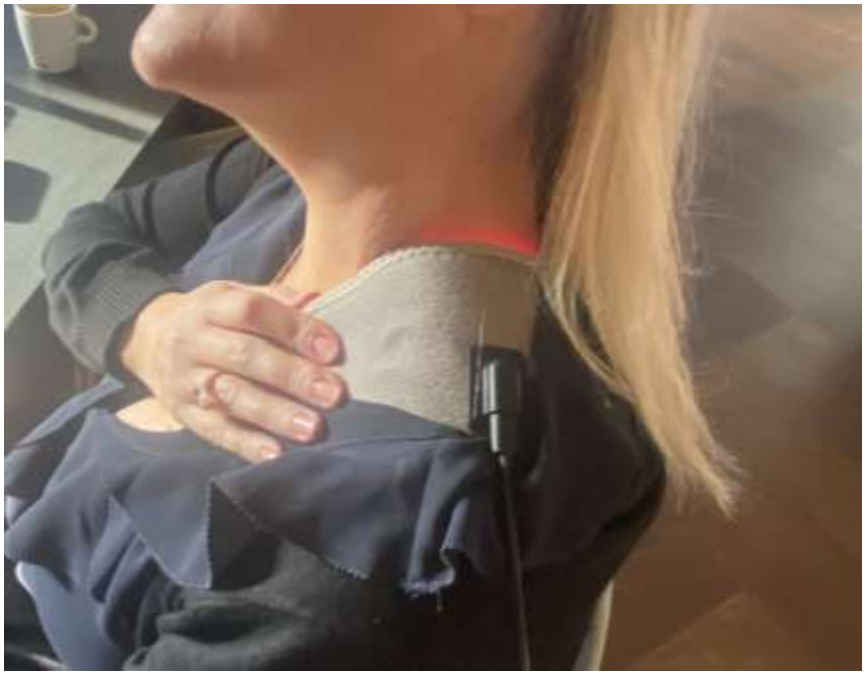

Figure 2. Application of SPRB directly over the collarbone and under the shirt. Direct skin contact is to be used with the device.

Use red and near-infrared wavelengths (660nm and 850–880nm) for optimal penetration via the SPRB and GPRB devices for localized application and the TYM for full body stimulation and recovery.

Device placement: Place directly over the clavicle (anterior and superior views). Include sternoclavicular and acromioclavicular joints if needed.

⚠ Cautions

- Avoid open wounds or infected surgical sites until cleared.

- Do not apply over the carotid sinus or thyroid area for extended durations.

- Confirm with the orthopedic surgeon that the fixation is stable before PBM use.

☑ Conclusion

Photobiomodulation (PBM) is a safe, non-invasive, and effective adjunctive therapy for promoting healing in patients with bone fractures, including those treated with internal fixation using wires, plates, or screws.

Extensive evidence supports the use of red and near-infrared light to reduce pain, accelerate tissue repair, and enhance bone remodeling—without interfering with metallic implants or surgical hardware.

Given its favorable safety profile, PBM can be confidently integrated into the rehabilitation protocols for virtually all types of fractures involving orthopedic fixation, including clavicle, limb, and maxillofacial bones

****** NOTE - If a user with orthopedic hardware (such as wires, plates, or screws) experiences discomfort or unusual heat sensitivity during PBM treatment, it may indicate local irritation or possible sensitivity related to the metal. In such cases, discontinue direct application over the hardware. PBM can still be beneficial by positioning the device above, below, or adjacent to the implant area, ensuring therapeutic coverage without direct contact over the fixation site.******

Key References

1. Gigo-Benato D et al. J Photochem Photobiol B. 2005;80(1):65–70.

2. Pinheiro AL et al. Photomed Laser Surg. 2009;27(2):219–25.

3. Lozano-Calderón SA et al. Clin Orthop Relat Res. 2008;466(3):655–65.