



Photobiomodulation (PBM) in Patients with Osteoporosis and Using PBM OE : Clinical Implications

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Introduction

Photobiomodulation (PBM) is increasingly used in wellness and therapeutic settings for its ability to reduce inflammation, support tissue regeneration, and alleviate pain. However, for individuals with systemic skeletal conditions such as osteoporosis, careful consideration must be given to device parameters, target tissues, and clinical indications. This article reviews the relevance of PBM for osteoporosis-related conditions, while highlighting specific PBM devices like the PBM Ortho OE model.

PBM and Its Biological Mechanisms

PBM uses non-ionizing light, typically in the 600–1100 nm wavelength range, to stimulate mitochondrial activity and enhance cellular energy (ATP) production. These effects can lead to:

- Enhanced bone remodeling support
- Increased local circulation
- Reduction of pain and inflammation
- Improved soft tissue repair

In musculoskeletal applications, PBM may help mitigate some effects of bone degeneration by promoting localized healing responses.

Osteoporosis and PBM – A Complex Relationship

Osteoporosis is characterized by reduced bone mass and microarchitectural deterioration, leading to increased fracture risk. Because PBM has been shown to influence osteoblastic activity, some early studies suggested that it might help stimulate bone formation. However, systemic osteoporosis presents a global skeletal weakness, not a localized injury.

Clinical Use Case: PBM Ortho OE Model and Osteoporotic Patients

The PBM Ortho OE model is a near-infrared, LED-based intraoral device designed for adult orthodontic patients. It may promote:

- Comfort during aligner or brace therapy
- Faster tooth movement (reported up to 50% faster)
- Enhanced appliance fit and seating
- Wellness-based support for soft tissue and periodontal health

However, in osteoporotic patients, especially older adults, several considerations may apply:

1. Bone Remodeling Sensitivity

Osteoporotic bone responds differently to mechanical and biological stimuli. While PBM may aid localized healing, its effect on compromised bone integrity remains under-researched, hence the health status of the patient has to be considered. Obviously the statement should be made that as part of the correct orthodontic screening prior to commencement of treatment the medical health of the patient has to be determined. If they are not healthy for orthodontic treatment then they are definitely not a candidate for PBM use.

2. Device Placement

PBM Ortho delivers near-infrared light directly into the oral cavity. For individuals with jawbone density loss or ongoing bisphosphonate therapy, stimulation of these areas should be on the advice of the patient's treating physician.

3. Individualized Risk-Benefit Evaluation

Treatment with the OE device (4 min per arch, twice daily) should only be considered in osteoporotic individuals most importantly if their medical health is stable and:

- Dental health is stable
- There is no active infection or active periodontitis
- The patient is not on photosensitizing medication

Integration into Clinical Workflow

For osteoporotic patients or those with mild bone density loss (osteopenia), PBM Ortho can be safely integrated into orthodontic and dental protocols:

- Twice-daily home use with 4 minutes per arch
- Adjustment visits to monitor fit, discomfort, and progress
- Use with any aligner or bracket system

Benefits for Patients and Providers

Even in carefully selected osteoporotic patients, PBM may offer:

- Reduced orthodontic or dental procedure pain
- Shortened recovery from extractions or minor surgeries
- Better tolerance of appliance and bracket placement as well as adjustments
- Increased patient satisfaction from a drug-free pain relief option

Conclusion

Photobiomodulation is a promising adjunctive modality for patients across the wellness and dental care continuum. However, in individuals with osteoporosis, the decision to use devices such as the PBM Ortho OE model must be made with caution, professional oversight, and personalized consideration. When appropriate, PBM can enhance quality of life, reduce discomfort, and support tissue vitality—but only if used safely and within evidence-based guidelines.

Disclaimer:

PBM Healing devices are not designed to diagnose, treat, cure, or prevent any disease. Use of these devices should not replace medical advice, diagnosis, or treatment from a licensed healthcare professional. Clinicians are encouraged to exercise their professional judgment in determining whether photobiomodulation is appropriate for individual patients, taking into account each person's health status, current treatments, and medical history

References

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