PHOTOBIOMODULATION IN PEDIATRIC DENTISTRY

A CLINICAL REFERENCE FOR DENTAL PROVIDERS

WHAT IS PHOTOBIOMODULATION?

Photobiomodulation (PBM) - also referred to as low-level laser therapy, Class IV laser therapy, or light therapy - is a non-invasive treatment that uses specific wavelengths of light to work with the body's own biology, stimulating natural healing and regulatory processes.

Light energy is absorbed at the cellular level, where it activates mitochondrial pathways, supports ATP production, reduces inflammation, enhances circulation, and helps regulate the nervous system - supporting the conditions needed for healing, comfort, and improved function.

Scope of Care in Pediatric Dentistry

Most state dental practice acts define the scope of dentistry to include the diagnosis and treatment of conditions affecting the oral cavity and its surrounding structures - which encompasses the muscles, tissues, and systems that directly influence oral and maxillofacial function. In pediatric dentistry, this is particularly meaningful. Oral function in infants and children does not exist in isolation - it involves the jaw, floor of mouth, neck, and surrounding musculature. Tension, restriction, or imbalance in any of these structures can directly impact feeding, oral motor development, airway health, and comfort.

PBM gives pediatric dental providers a powerful tool to address these structures meaningfully and non-invasively right there in their office.

The Science: Why Multi-Wavelength Matters

Much of the foundational PBM research was performed using single wavelengths - often in the 630-660 nm or 800-830 nm range - and those studies clearly demonstrate clinical benefit when properly dosed. More recent evidence suggests that delivering multiple wavelengths simultaneously may enhance outcomes by stimulating multiple biological pathways at once.

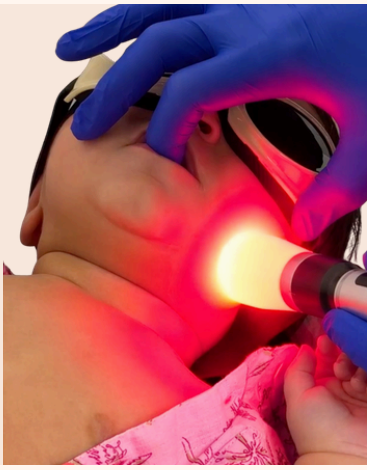
The Summus Medical Laser delivers four wavelengths - 650, 810, 915, and 980 nm - within a single treatment session. These are among the most studied wavelengths in the PBM literature. Each interacts differently with tissue:

650 nm	*Superficial absorption supporting epithelial tissue healing and cellular repair at the surface level.*
810 nm	*Primarily targets cytochrome c oxidase, supporting ATP production and cellular energy.*
915 nm	*Greater interaction with oxygenated hemoglobin, supporting oxygen availability at the tissue level.*
980 nm	*Higher water absorption at this wavelength may support local microcirculation and fluid movement in the treated tissue.*

Together, these wavelengths support healing through multiple biological pathways simultaneously - energy production, oxygenation, and circulation - rather than relying on a single mechanism. Dosing is calculated precisely by the device based on the area being treated, the size of the patient, and the treatment goal, so the provider always knows the exact number of joules delivered.

CLINICAL APPLICATIONS IN PEDIATRIC DENTISTRY

While the Summus unit includes an intraoral handpiece, what truly expands its clinical potential is the open tip cone handpiece. It allows light to penetrate through the skin extraorally - reaching the jaw, lips, cheeks, floor of mouth, frenula, sinuses, neck, and shoulders without ever going intraoral. For dentists, thinking extraorally can be a new thought process - and yet the mouth has always been connected to everything around it. It is an exciting time in our field, where providers are increasingly embracing a more comprehensive, whole-body approach to patient care.



Musculoskeletal & Orofacial Tension

PBM can help reduce inflammation and ease tension in the jaw, floor of mouth, neck, and shoulders - structures directly involved in oral function, comfort, and range of motion across all ages. In infants, treating these areas extraorally can support the full neuromuscular system involved in feeding and latch.

In older children and teens, patients may notice improved jaw comfort, easier movement, and reduced tension - particularly those in orthodontic treatment or working with a myofunctional therapist.

Pre & Post-Frenectomy Care

Pre-operatively, PBM can help relax the floor of mouth muscles and surrounding tissues, support better visualization of the frenulum, and prepare the tissue environment for the procedure. Post-operatively, treating the same areas extraorally supports optimal healing, may help reduce scar tissue formation, and encourages the body to adapt to its new range of motion.

Recommended at the consultation visit/prior to frenectomy appointment, the day of the procedure, and at follow-up appointments.

Sinus & Airway Support

PBM can support circulation and may help reduce inflammation in the sinus tissues, supporting congestion relief and more comfortable nasal breathing. For airway-focused cases, treating the jaw, throat, and surrounding musculature may help reduce tissue inflammation and support better airway function.

Identifying root cause remains the priority PBM is a powerful in-office adjunct alongside other treatment approaches.

Post-Procedural Healing

Following any intraoral procedure, PBM can help reduce inflammation, support tissue repair, and encourage healthy healing.

It may also help minimize scar tissue formation and support the surrounding tissues as they adapt.

Oral Functional Development & Myofunctional Support

PBM can be a meaningful complement to myofunctional therapy - helping ease tension in the surrounding muscles and tissues as children work to develop oral function and movement patterns.

When the body is relaxed and supported, therapy tends to be more effective and progress comes more readily.

Oral Inflammation & Mucosal Comfort

PBM supports cellular healing, may help reduce inflammation, and can support the healing process for oral lesions, ulcers, and areas of mucosal irritation - providing meaningful comfort for patients of all ages.

General Comfort & Nervous System Regulation

PBM supports nervous system regulation across all ages - one of the most consistent observations is a calming, settling effect during and after treatment. For babies, this often means a more relaxed feed and a more comfortable experience for the whole family.

For older children and adults, it can help ease anxiety before or during a dental visit, making the overall experience in the office more positive. This calming effect is something patients tend to notice and remember.

Orthodontic & Expansion Support

PBM can help ease muscle tension and discomfort in the jaw and surrounding tissues that builds up during orthodontic treatment and palate expansion. It may also support sinus health and help with the pressure or congestion that sometimes accompanies expansion - supporting the tissues as they adapt at every stage of treatment.

Maternal Applications

Parents of newborns carry significant tension in the shoulders and neck from feeding around the clock. Treating these areas with PBM can help ease muscle tightness, support circulation, and provide meaningful relief. PBM can also be a supportive adjunct for nipple discomfort, breast tenderness, and clogged ducts - mothers have reported meaningful changes after even one session. It is essential that mothers are working with an IBCLC to identify and address the root cause of any latch or breastfeeding challenge.

PBM supports the body alongside that care - it does not replace it. A parent who is more comfortable can feed more comfortably, which directly benefits baby too.

WHAT TO EXPECT IN PRACTICE

PBM is non-invasive and well-tolerated across all ages - from newborns to adults. Most patients notice a mild, soothing warmth during treatment. Individual treatment areas take just a few minutes each - most appointments cover two to three areas, keeping the overall session time short and efficient. Effects are cumulative - even a single session can make a meaningful difference. For more acute concerns, twice in one week with a few days between is recommended. For general wellness and maintenance, once weekly or once every two weeks works well.

The Summus Medical Laser calculates dosing automatically based on the treatment area, patient size, and goal delivering a precise, measured amount of energy every time. Providers always know exactly how many joules were delivered. The application library is comprehensive and includes pediatric-specific protocols, making treatment straightforward and confidence-building from the very first session. Treating babies and young children is always a collaborative effort. PBM does not replace feeding support, oral motor therapy, or bodywork - it works best as part of a team approach alongside IBCLCs, SLPs, OTs, PTs, and myofunctional therapists. When the whole team is working together, outcomes are so much better for the whole family.

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