

Clinical applications of lasers in dentistry field

Volume 9 Issue 1 - 2023

Introduction

LASER comes from the English acronym *Light Amplification by Stimulated Emission of Radiation*. It is based on the transmission of electromagnetic radiation with photon waves in phase, accessing the origin of the injury; it also gained its space with various applications from prevention, therapy to aesthetic surgery. Consisting of substances that produce a beam of light, popularly called “laser beam”, when they are stimulated by an energy source, laser therapy was described in the 80s, evolving and taking a prominent place in treatments in the medical field, and recently, including modern Dentistry. Currently, patients can use lasers to minimize or alleviate symptoms of orofacial pain, hypersensitivity, teeth whitening and antimicrobial agents.¹⁻⁵

Antimicrobial therapies present the principle of eliminating microorganisms using a sensitizing agent and an appropriate light source, thus promoting the elimination and/or minimization of microorganisms or pathologies present in periodontal tissues. Furthermore, such therapeutic resources provide pain reduction and edema regression, through the release of low energy to a target cell to stimulate its membranes and organelles, leading to active photobiomodulation.^{6,7}

The effects of laser therapy on common types of pathologies have recently been evaluated by some researchers. Its analgesic function is through the minimization of histamine, prostaglandin, increased serotonin, acetylcholine, bringing significant results in the pain threshold of treated patients. All the energy emanated by the laser is absorbed by a subtle layer of the affected tissue, leveraging cellular metabolism. As mitochondrial activity is stimulated, the laser acts to regress the inflammatory and analgesic chain and thus heal the lesions. The particularity of the treatment is photobiomodulation, ensuring that the lesions are treated, preventing tissue integrity during the emission of rays.⁵

As these are minimally invasive, accessible, and non-traumatic techniques, where the literature does not demonstrate reports of toxicity, the way in which lasers are used is broad and promising in certain procedures aimed at therapeutic use in tissues, without the possibility of risk of harm healthy cells. In the Dentistry field, there are several ways to apply the laser, and this range of alternatives is only viable because the laser can be used at different wavelengths, for different treatments, with different results. In addition to having wide and varied uses, the clinical use of the laser is in line with the conduct of minimally invasive Dentistry, offering faster, more satisfactory results and resulting in reduced pain for patients.

Currently, the use of LASERS in Dentistry field is incredibly popular, and can now be considered a reality in Brazil, and equipment that should be part of daily clinical practice in the dental office and in educational institutions. Low-power lasers have been implemented in several current clinical applications, to obtain eradication of bacteria, aesthetic and functional treatments, as they change the minimum possible temperature of the tissue, without causing injuries or morphological changes in the structure of adjacent normal tissues. Adapting the practice of using lasers in everyday dental treatments aims to reduce treatment costs, enable and optimize the time of surgical, aesthetic and rehabilitation processes, characterizing it as

Carolina dos Santos Santinoni

Professor at Undergraduate Dental School of Federal University of Santa Catarina – UFSC, Brazil

Correspondence: Carolina dos Santos Santinoni, Professor at Undergraduate Dental School of Federal University of Santa Catarina – UFSC, Brazil, Email carolsantinoni@msn.com**Received:** November 13, 2023 | **Published:** November 14, 2023

a therapeutic resource that facilitates procedures during procedures, which makes it the first-choice resource in several specializations.

Acknowledgments

None.

Conflicts of interest

The author declares that there are no conflicts of interest.

Funding

None.

References

1. Santinoni CS, Neves APC, Almeida BFM, et al. Bone marrow coagulated and low-level laser therapy accelerate bone healing by enhancing angiogenesis, cell proliferation, osteoblast differentiation, and mineralization. *J Biomed Mater Res A*. 2021;109(6):849–858.
2. Santinoni CS, Calles LJ, Farias NL, et al. Photobiomodulation of fresh bone marrow aspirate for regenerative therapy. *Research, Society and Development*. 2021;10(11): e140101119545.
3. Santinoni CD, Oliveira HF, Batista VE, et al. Influence of low-level laser therapy on the healing of human bone maxillofacial defects: A systematic review. *J Photochem Photobiol B*. 2017;169:83–89.
4. Nagata MJ, de Campos N, Messoro MR, et al. Platelet-rich plasma, low-level laser therapy, or their combination promotes periodontal regeneration in fenestration defects: a preliminary in vivo study. *J Periodontol*. 2014;85(6):770–778.
5. Nagata MJ, Santinoni CS, Pola NM, et al. Bone marrow aspirate combined with low-level laser therapy: a new therapeutic approach to enhance bone healing. *J Photochem Photobiol B*. 2013;121:6–14.
6. Garcia VG, Longo M, Fernandes LA, et al. Treatment of experimental periodontitis in rats using repeated adjunctive antimicrobial photodynamic therapy. *Lasers Med Sci* 28, 143–150 (2013).
7. Santinoni CS, Silveira FM, Caldeira ML, Genaro V, Martins TM, do Amaral CCF, Maia LP, Mori GG, Ervolino E, Pola NM. Topical sodium alendronate combined or not with photodynamic therapy as an adjunct to scaling and root planing: Histochemical and immunohistochemical study in rats. *J Periodontol Res*. 2020 Dec;55(6):850-858.