

Association of antimicrobial photodynamic therapy (aPDT) and platelet- and leukocyte-rich fibrin (L-PRF) in immediate dental implant surgery in contaminated alveoli with extensive bone loss

Paulo Ney Lyra de Moraes¹, Marcia Cristina Dias-Moraes², Denise Maria Zezell¹

¹ Center for Lasers and Applications, the Professional Master Program in Radiation Technology in Health Sciences, Nuclear and Energy Research Institute (IPEN – CNEN), São Paulo, Brazil;

Laser Laboratory, Department of Dental Surgery, Wrocław Medical University, Poland

² University Center Serra dos Orgãos (UNIFESO), Teresopolis, Rio de Janeiro, Brazil

The Professional Master Program in Radiation Technology in Health Sciences (MP-TRCS) of the Nuclear and Energy Research Institute (IPEN/CNEN)

Advances in Clinical and Experimental Medicine, ISSN 1899–5276 (print), ISSN 2451–2680 (online)

Adv Clin Exp Med. 2023;32(Special Issue 4)

Funding sources

This work was supported by CNPq (INCT-INTERAS 406761/2022-1 and INCTINFO 465763/2014-6; Sisfoton 440228/2021-2; PQ 314517/2021-9); CAPES Finance code 001 and FAPESP 17/50332-0.

Abstract

In patients with extensive bone loss, dental implants are a challenge for oral rehabilitation. The presence of dental infection requires prior resolution with several surgical steps. Local decontamination after tooth extraction, using antimicrobial photodynamic therapy (aPDT – low-level laser: 660 nm, 100 mW, 60 s, 6 J, Laser Duo, MM Optics, SP/Brazil; methylene blue 0.01%, Chimiolux 10 – DMC, SP/Brazil), followed by the release of growth factors and angiogenesis stimulation achieved by the use of platelet- and leukocyte-rich fibrin (L-PRF), have the potential to reduce the number of surgical interventions, being safe for patients, even in the presence of systemic diseases. The Hounsfield index variation was evaluated using the Dental Slice software (BioParts) in cone-beam computed tomography scans, performed before and 3 months after dental implant surgery (ArcsysFGM, SC/Brazil) in patients who had extensive bone loss with the presence of local infection and underwent local decontamination with aPDT and the use of L-PRF (hydration of the xenogenous graft and membrane to protect the surgical area). The change in ROI cross-sectional areas was also compared using ImageJ software before and after 3 months. The torque evaluation with the aid of the system ratchet (35 N) was assessed after the exposure of the implants, without pain, showing the stability of the implants. With the association of these techniques in a single surgical moment, there was osseointegration of the implants, showing the potential of this protocol in critical areas, reducing the number of surgical interventions and medications (anesthesia, antibiotics, anti-inflammatories, analgesics), improving the quality of life of patients in a reduced time interval compared to the conventional protocol. Systemically compromised patients, such as those with heart disease and diabetes, may be particularly favored.

Copyright

Copyright by Author(s)

This is an article distributed under the terms of the Creative Commons Attribution 3.0 Unported (CC BY 3.0) (<https://creativecommons.org/licenses/by/3.0/>)