



Letter to the Editor, “Platelet-Rich Fibrin as a Novel Bio-Carrier for the Transfer of Antibiotics to the Root Canal System”

Article Info

Article type:

Letter to the Editor

Article History:

Received: 11 May 2024

Accepted: 05 Nov 2024

Published: 02 Jun 2025

Keywords: Antibiotics; Local Drug Delivery System; Platelet-Rich Fibrin; Root Canal System

Rojin Samani¹, Ardavan Parhizkar^{2,3*}

1. School of Dentistry, Shahid Beheshti University of Medical Sciences, Tehran, Iran
2. Iranian Centre for Endodontic Research, Research Institute for Dental Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran
3. Department of Endodontics, School of Dentistry, Tehran University of Medical Sciences, Tehran, Iran

*Corresponding author:

Iranian Centre for Endodontic Research, Research Institute for Dental Sciences, Shahid Beheshti University of Medical Sciences, Daneshjoo Blvd., Daneshgah (Shahriari) Square, Evin, Tehran, Iran

Email: ardavanparhizkar@yahoo.co.uk

- **Cite this article as:** Samani R, Parhizkar A. Letter to the Editor, “Platelet-Rich Fibrin as a Novel Bio-Carrier for the Transfer of Antibiotics to the Root Canal System”. *Front Dent.* 2025;22:22. <http://doi.org/10.18502/fid.v22i22.18866>

Dear Editor,

In recent years, with the advancements in conservative and non-invasive dental treatments, presentations of modern-day technologies, introduction of novel dental (bio)materials, and in-depth experimental/in vivo investigations in basic and clinical oral sciences, local drug delivery systems have been vastly considered and used in dentistry; notably within the field of endodontics. Various local drug delivery systems have shown to efficiently transfer different loaded agents, e.g. cells or antibiotics, to their intended site, i.e. dental pulp in root canal systems; aiming to preserve or heal its target, and cause the refunctionalisation of its compromised connective tissue [1].

Platelet-rich fibrin (PRF) is the second generation of platelet concentrates; emerging as an avant-garde platform for delivering agents to the desired site(s) due to its progressive degradation without development of allergic or inflammatory response [2]. Moreover, PRF is deliberated as a composed matrix, and its utilization has demonstrated to (i) promote the migration of epithelial cells, (ii) facilitate micro-vascularisation, (iii) expedite the process of wound healing, and (iv) exhibit antimicrobial properties without requiring additional processing or preparation. It is assumed that the antimicrobial effects of PRF result from the release of antimicrobial proteins and cytokines from different cells, particularly leukocytes, within the fibrin matrix. Recent studies have exhibited the pronounced efficacy of PRF combined with antibiotics in inhibiting the growth of aerobic and anaerobic bacteria and microorganisms; surpassing the antimicrobial activity of PRF alone [3].

Platelet-rich fibrin is being increasingly used in different dental treatments; e.g. in the management of bony defects, dental implant procedures and post-operative recovery, for regeneration and disinfection purposes. In addition, research has indicated bactericidal and growth-inhibiting properties of PRF against biofilm-forming and periodontal microorganisms. Due to the inherent risk

of infection accompanying surgical operations and the necessity of infection control to ensure successful outcomes, using PRF in combination with antibiotics, has attracted much attention as a viable topical intervention in surgical procedures [4].

One of the most pivotal and challenging steps in regenerative endodontics is the thorough elimination and/or sufficient removal of microbial population. Recent state-of-the-art studies have directed their attention towards the development of advanced local drug delivery systems and scaffolds; aiming at the optimisation of root canal disinfection while, simultaneously, alleviating the risk of stem cell toxicity. Therefore, PRF can be elaborated as an effective platform for the disinfection of root canal system, and thus, its combination with antibiotics could demonstrate a significant reduction in total bacterial community as well as a decrease in the presence of viable bacteria within the root canal [5]. The potential of PRF and its derivatives as potential bio-carriers for antibiotics within the root canal system has been minimally explored in recent studies. Consequently, there is a need for further research and in vitro/in vivo investigations to gain a much deeper understanding of PRF's capabilities as an antibiotic carrier for root canal system. By conducting more comprehensive studies and well-designed trials, valuable insights can be obtained which, in turn, could enhance the application of PRF in diverse endodontic practices, specifically root canal disinfection.

CONFLICT OF INTEREST STATEMENT

None declared.

REFERENCES

1. Parhizkar A, Asgary S. Local drug delivery systems for vital pulp therapy: a new hope. *Int J Biomater*. 2021 Sep 15;2021:5584268.
2. Ercan E, Suner SS, Silan C, Yilmaz S, Siddikoglu D, Sahiner N et al. Titanium platelet-rich fibrin (T-PRF) as high-capacity doxycycline delivery system. *Clin Oral Investig*. 2022;26(8):5429-38.
3. Straub A, Vollmer A, Lâm T-T, Brands RC, Stapf M, Scherf-Clavel O et al. Evaluation of advanced platelet-rich fibrin (PRF) as a bio-carrier for ampicillin/sulbactam. *Clin Oral Investig*. 2022;26(12):7033-44.
4. Polak D, Clemer-Shamai N, Shapira L. Incorporating antibiotics into platelet-rich fibrin: a novel antibiotics slow-release biological device. *J Clin Periodontol*. 2019;46(2):241-7.
5. Rafiee A, Memarpour M, Najibi Y, Khalvati B, Kianpour S, Morowvat MH. Antimicrobial efficacy of a novel antibiotic-eluting injectable platelet-rich fibrin scaffold against a dual-species biofilm in an infected immature root canal model. *Biomed Res Int*. 2020 Dec 8;2020:6623830