



Endodontical treatment of periapical tooth injury with photodynamic therapy: Case report

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ABSTRACT

This article describes the use of Photodynamic Therapy (PDT) during the endodontic treatment of teeth with periapical lesion. Patients presented tooth 35 with diagnostic hypotheses of Periapical Cyst or Granuloma. The Crown-Down preparation was performed with the HyFlex CM system. In case I it was not possible to reach the working length, in case II the foraminal debridement was performed at the actual tooth length. In the final irrigation, the E1 - Irrisonic ultrasonic insert was used, promoting sequentially agitation of NaOCl 2.5%, EDTA 17% and NaOCl 2.5%. Then, PDT was applied with 0.005% methylene blue dye. Calcium Hydroxide with Parammonochlorophenol was used and after 15 days, the final irrigation protocol and PDT were performed again. After 90 days of case I and 1 year of case II, the total lesion regression was observed in both cases. It is concluded that the proposed treatment improved the microbial disinfection favoring the regression of the periapical alterations providing satisfactory clinical and radiographic results.

1. Introduction

Advances in endodontic decontamination focus on methods that assist in disinfection of the Root Canal System (SCR). PDT has been proposed as a coadjuvant during endodontic treatment due to its low toxicity and antimicrobial action [2]. In which, it emphasizes its capacity to prevent microbial proliferation between sessions and the high rate of elimination of pathogens [3].

PDT is an important modality of complementary treatment, which can help in the significant reduction of microorganisms and thus contribute to the solution of cases. Therefore, the purpose of this article is to report the use of PDT during the endodontic treatment of teeth with periapical lesions, in order to potentiate root canal decontamination and favor apical repair.

2. Case report

Patients presented tooth 35 with pulp necrosis, circumscribed bone rarefaction and symptomatology only in the vertical percussion test, distributed in case I and case II (Figs. 1A and 2 A). The diagnosis of both

cases was of Cyst or Periapical Granuloma. The preparation was performed using the Crown-Down technique with the HyFlex CM system (COLTENE, Altstätten, Switzerland) and the irrigation solution was sodium hypochlorite (NaOCl) 2.5% (ASFER, São Caetano do Sul, SP, Brazil).

In case 1, it was not possible to reach the working length (CT) and perform the foraminal debridement, since the third apical radicular was calcified, so the instrumentation was performed 5 mm short of CT. While in case 2 the foraminal debridement was performed and instrumentation 0.5 below the CRD. After the preparation, passive ultrasonic irrigation (PUI) was performed using the E1 - Irrisonic insert (Helse Ultrasonic, Santa Rosa de Viterbo, São Paulo, Brazil), promoting the sequential agitation of NaOCl 2.5%, EDTA-T 17% (Fórmula and Ação, São Paulo, SP, Brazil) and NaOCl 2.5%.

Subsequently, the application of the PDT was carried out, blue dye of 0.005% methylene (Chimiolux, DMC, Plantation, Florida, USA) left for 5 min. Laser with wavelength from 400 nm to 660 nm, 18 J, in which fiber was introduced into the apical portion of the root canal, with apical to cervical movement to ensure equal diffusion of light into the lumen of the canal, for 90 s. Saline solution irrigation, drying and

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Fig. 1. A: Initial periapical radiography, circumscribed bone rarefaction involving the apex of teeth 35. B: Periapical radiography after completion of treatment. C: Periapical radiography thirty days after completion of treatment. D: Periapical radiography ninety days after completion of treatment, showing absence of radiolucent area, new bone formation and restructuring of periapical tissues in the periapical region of teeth 35.



Fig. 2. A: Initial periapical radiography, circumscribed bone rarefaction involving the apex of teeth 35. B: Periapical radiography after completion of treatment. C: Periapical radiography sixty days after completion of treatment. D: Periapical radiography one year after completion of treatment, showing absence of radiolucent area, new bone formation and restructuring of periapical tissues in the periapical region of teeth 35.

filling of the canals were done with Calcium Hydroxide with Paramonochlorophenol (Calen PMCC, SS White, Rio de Janeiro, RJ, Brazil). After 15 days, there was no symptomatology, the medication was removed and the final irrigation through PUI and a new PDT application were performed. The root canals were filled with the endodontic cement AH Plus (Dentsply Maillefer, Petrópolis, RJ, Brazil) (Figs. 1B and 2 B).

In case I after 30 days (Fig. 1C) and 90 days (Fig. 1D) of filling period, it was possible to observe that there was regression of the periapical lesion. However, in case II, it was possible to observe the reduction of the periapical lesion after 60 days of obturation (Fig. 2C) and after 1 year it was possible to verify apical tissue repair (Fig. 2D).

3. Discussion

In addition to conventional endodontic treatment, PDT is a useful microbial reduction tool because it has a broad spectrum of action in order to provide a higher quality treatment [3,4].

The literature shows that teeth with apical periodontitis demonstrated better bone healing and reduction of microorganisms after conventional treatment associated with PDT [3]. Thus, the present work proposed the use of PDT during the endodontic treatment of teeth with periapical lesion in order to potentiate root canal decontamination and favor periapical repair, as in other case reports [1,2].

PDT allows the reach of the microbicidal effect to the most difficult areas within the SCR, where often even the host defense agents can not

reach, therefore, the introduction of thin and flexible glass fibers allows the laser light to penetrate the portion the deepest third of the apical root [3]. As evidenced in case I, in which it was possible to observe that even the proposed treatment has not reached the CT, the repair of the periapical tissues was verified.

The literature reports that in addition to the elimination of bacteria, PDT accelerates the processes of bone formation in the periradicular area and is a strong stimulus for bone healing [2]. The results showed that the use of PDT added to the endodontic treatment provided the repair of the periapical tissues even in the case in which it was not possible to instrument the root canal in the CT.

4. Conclusion

The protocol established in these two treatments: root canal cleaning, intracanal medication and PDT may have been favorable for the clinical success of the presented cases. Therefore, it is concluded that the proposed treatment proved viable, potentiated the microbial disinfection favoring the regression of the periapical alterations, providing satisfactory clinical and radiographic results. PDT is promising as adjuvant to conventional treatment, but more detailed clinical studies are needed to identify its efficacy.

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