TITLE: ANTIMICROBIAL PHOTODYNAMIC THERAPY ASSOCIATED WITH THE CONVENTIONAL ENDODONTIC TREATMENT: A CLINICAL AND MOLECULAR MICROBIOLOGICAL STUDY

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ABSTRACT:

Apical periodontitis is generally a sequel of endodontic infections and the microorganisms have a critical role in its etiology and pathogenesis. The microorganisms associated with primary endodontic infection are diverse, including the uncultivable ones. Therefore, the reduction of microorganisms in infected root canal systems is a fundamental component of successful endodontic treatment. The aim of this study was to evaluate the effects of antimicrobial photodynamic therapy as an adjunct of the primary endodontic conventional treatment. Ten uniradicular teeth (control group = 4 and test group = 6) with endodontic infections were selected. Samples were collected before and after the chemical-mechanical instrumentation, after the antimicrobial photodynamic therapy (for the test group) and after the temporary restorations removal at the second session. In test group, the antimicrobial photodynamic was performed with 0.01% methylene blue solution and irradiated with Indium gallium aluminum phosphorus (InGaAlP) laser (660nm; 100 mW; 40s) with a disposable plastic optical fiber-coupled laser. Another illumination (3J; 30s) was performed in the attached gingival close to the apical foramen. Microbial detection was performed by polymerase chain reaction. The genes of *E. faecalis*, *Candida* sp. and Bacteria domain were detected. For test group, the tooth that presented positive sample for *Candida* sp. before of the chemical-mechanical instrumentation presented negative results in subsequent samples. Additionally, *E. faecalis* was not detected at the second session, but this species was present in the samples from two teeth after the chemical-mechanical instrumentation and in one after the antimicrobial photodynamic therapy. The antimicrobial photodynamic therapy may be used as an effective adjunct therapy, resulting in a significant reduction (100%; p=0.0286) of the incidence of *E. faecalis* before root canal obturation.

Keywords: Antimicrobial Photodynamic Therapy, Dental Pulp Necrosis, Polymerase chain reaction, *Enterococcus faecalis*, *Candida* sp.

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