

APPLICATION OF A NON-THERMAL PLASMA TO A TOOTH ROOT CANAL

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Formocresol and calcium hydroxide are commonly used as the clinical disinfectant of root canals. Although they have strong chemical disinfection properties, their cytotoxic effects have always been a concern. *E. faecalis*, which is responsible for root canal failure, can also cause life-threatening infections in humans, especially in the nosocomial (hospital) environment, where naturally high levels of antibiotic-resistance towards *E. faecalis* are found and contribute to its pathogenicity.

In this study, we demonstrate a promising method for the tooth root canal disinfection by an atmospheric-pressure Ar/O₂ (2%) cold plasma microjet (PMJ). The inactivation of *E. faecalis* was verified by bacterial viability test (fluorescence microscopy). Scanning electron microscopy was employed to evaluate the plasma effect on tooth structure and the morphological changes of *E. faecalis*. High concentrations of OH radical were detected by Electron Spin Resonance (ESR) spectroscopy and strong atomic oxygen emissions were observed in the optical emission spectra in air. Possible pathway for the disinfection will be discussed.

* Work supported by Bioelectrics Inc. (U.S.A.), the Peking University Biomed-X Foundation and China International Science and Technology Cooperation (2008KR1330 - "Cold Plasma induced biological effect and its clinical application studies")