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التوثيق الالكتروني والميكروفيلم

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قسم

نقسم باللّه العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

Evaluation of The Effect of Diode Laser on Root Canal Disinfection, Canal Cleanliness, Fracture Resistance of Tooth Structure and Bond Strength to Root Canal Dentin An in Vitro Study

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Introduction

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Successful treatment of the root canal system depends on preparing, disinfecting and hermetic sealing of the root canal system. A proper disinfection of the root canal is a major factor in the success of the treatment not only during the preparation but also after the preparation.

During the preparation eradication of persisting bacteria in the distant areas of the tubular root canal system is a major challenge in treatment regimens, and is crucial for the long term preservation of endodontically treated teeth. As it's well known that during root canal infection, the microenvironment of root canal favors the selection of few bacterial species like Enterococcus faecalis, which is a therapy resistant, gram positive facultative anaerobe that can proficiently invade dentinal tubules, survive chemomechanical instrumentation and intracanal medication, and can also adapt to altered nutrient supply and continue to remain viable within the dentinal tubules. Also following the chemomechanical preparation, a smear layer of 1 to 2 nm thick is composed on the root canal walls. It consists of inorganic dentin debris and organic substances containing fragments of odontoblastic processes, microorganisms, their byproducts, and necrotic pulp tissues. This smear layer is responsible for harboring remnants of necrotic pulp tissues along with biofilms. Residual biofilms can accommodate as a potential source of sedulously assiduous infection and treatment failure.

Currently, Sodium hypochlorite (NaOCl) and Ethylene-diaminetetraacetic acid (EDTA) are the most commonly used root canal irrigation solutions due to its antimicrobial and tissue-dissolving

properties. However, it does not completely disinfect the root canal system specially the inner layers of dentin. And the apical third of root canal, with its high percentage of ramifications and variations which escapes the debriding action of conventional chemomechanical preparation procedures. Following the preparation the presence of the smear layer could inhibit penetration of the root canal irrigation solutions and medicaments into dentinal tubules leading to recurrent infection. Thus, an additional disinfection agent is essential. The use of lasers for example the high power diode laser is a currently available disinfectant option that is consider as an advanced approach for disinfection. As it helps to reduce the number of microorganisms in root canals, by its ability to penetrate dental tissues providing access to formerly unreachable parts of the tubular network better than irrigant solutions. As well as its ability to kill the bacteria by the use of energy and wavelength characteristics.

Another important factor to consider is the ultrastructural alterations of dentine irradiated with a diode laser and the effect of NaOCl/EDTA as irrigation substrate in the removal and modification of the smear layer as well as the introduction of cracks and melting. These surface modifications in the intraradicular dentin is correlated with changes in apical leakage, dentine permeability, and the adhesion of sealers. Which in return would affect the morphology of dentine and the fracture resistance of laser irradiated teeth.

Moreover, the abstraction of the smear layer may lead to alteration in the bond strength of filling material to canal walls, as the bond strength of the obturation system upon setting in the root canal space depends on the opening of the dentinal tubules present, which