بسم الله الرحمن الرحيم

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تم رفع هذه الرسالة بواسطة / حسام الدين محمد مغربي

بقسم التوثيق الإلكتروني بمركز الشبكات وتكنولوجيا المعلومات دون أدنى مسئولية عن محتوى هذه الرسالة.

ملاحظات : لا يوجد

The Effect of Nanoparticle Addition to a Bioceramic Sealer on its Intra-Tubular Penetration

Submitted thesis to the Endodontic department of the faculty of Dentistry at Ain Shams University

for

Partial Fulfillment of the Requirements for
The Master Degree in Endodontics

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(B.D.S., Nahda University – 2013)

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2022

Acknowledgment

First and foremost, thanks are due to Allah for without him i can do nothing.

I'd like to express my respectful thanks and profound gratitude to ***Assoc. Prof. Medhat Taha El Farmawy,*** *Associate Professor of Endodontics, Faculty of Dentistry, Ain Shams University for his keen guidance, kind supervision.*

I wish also to express my deepest gratitude to ***Dr. Sarah Hossam Fahmy,*** *Lecturer of Endodontics, Faculty of Dentistry, Ain Shams University2for her guidance, endless assist and for offering me much of her time, effort and support throughout the whole work.*

Nadien Ashraf Thabet

Dedication

This work is dedicated to …

Words are not sufficient to convey my gratitude to **my loving parents**, **sisters and brother** to whom I owe everything. Their prayers, unwavering faith and confidence in me has helped me to be the person l am today. I humbly dedicate this work to them.

List of Contents

List of Tables

List of Figures

List of Figures (Cont…)

List of Figures (Cont…)

List of Figures (Cont…)

List of Figures (Cont…)

List of Figures (Cont…)

List of Abbreviations

Abb.	Full term
BDA	*Bis-dequalinium acetate*
CA	*citric acid*
CEJ	*cementoenamel junction*
C-HA	*Chitosan-Hydroxyapatite precursor*
CHX	*Chlorhexidine*
CLSM	*Confocal laser scanning microscope*
EA	*EndoActivator*
EAW	*Electronically activated water*
EC	*Easy Clean*
EDS	*energy-dispersive x-ray spectroscopy*
EDTA	*Ethylenediaminetetraacetic acid*
Er:YAG	*Erbium:yttrium-aluminum-garnet*
ES	*Endo Spray*
EV	*EndoVac*
GF Bioseal	*Guttaflow bioseal*
H2O2	*Hydrogen peroxide*
HEBP	*etidronic acid*
HRS	*Hybrid root seal*
LAI	*Laser-activated irrigation*
LS	*Lentulo spiral*
MA	*maleic acid*
MTA	*Mineral trioxide aggregate*
NaOCl	*Sodium hypochlorite*
Nd:YAG	*Neodymium-doped:yttrium-aluminum-garnet*
NT	*Syringe and NaveTip needle*
NTS	*Novel tricalcium silicate-based sealer*
PAA	*peracetic acid*
PAD	*Photo-activated disinfection*
PBS	*phosphate buffer solution*

List of Abbreviations (Cont…)

Abb.	Full term
PCS	*Zinc oxide based Pulp Canal sealer*
PIPS	*Photon-induced-photoacoustic streaming activation*
PUI	*Passive ultrasonic irrigation*
Pz-	*pozzolan--based*
SAF	*Self-Adjusting File*
SEM	*Scanning electron microscopy*
SI	*Sonic irrigation*
TCS	*tricalcium silicate sealer*
TiO2	*Titaniumdioxide*
UTS	*ultimate tensile strength*
ZOE	*Zinc Oxide Eugenol*

INTRODUCTION

The main goal of root canal treatment is to provide a three-dimensional obturation of the root canal system. A hermetic seal reduces coronal leakage and bacterial contamination, prevents apical periodontitis, and entombs the remaining irritants in the root canal.Various endodontic materials have been developed for complete and impermeable fillings. Root canal sealers are necessary to seal the gap between the root dentin wall and the obturating material. Sealers should seal the root canal apically and laterally, and also fill voids and irregularities. The ability of the sealer to penetrate into the dentinal tubules is important, as this helps the sealer provide a fluid-tight seal and prevent penetration by microorganisms and toxins [55].

Due to the relative biological and technical importance of sealers, their chemical and physical properties have been the subject of considerable attention since their initial development in the early twentieth century.Sealers are categorised according to their main chemical constituents: zinc oxide eugenol, calcium hydroxide, glass ionomer, silicone, resin, and bioceramic-based sealers.

Bioceramic-based sealers have only been available for use in endodontics for the past thirty years, their rise to prominence corresponding to the increased use of bioceramic technology in the fields of medicine and dentistry.