



شبكة المعلومات الجامعية

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ



شبكة المعلومات الجامعية
@ ASUNET



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكرو فيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of
15-25- c and relative humidity 20-40%

بعض الوثائق الأصلية تالفة

بالرسالة صفحات لم ترد بالاصل

**EFFECT OF DIODE LASER AND SODIUM
HYPOCHLORITE ON ROOT
CANAL BACTERIA**

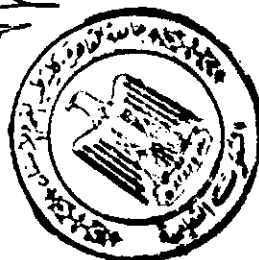
B7291

Thesis submitted to the Faculty of Oral and Dental
Medicine, Cairo University, in partial fulfillment of
the requirements of
Master Degree in Endodontics

BY
Latifa Mohamed Abd El-Gawad
(B.D.S)

FACULTY OF ORAL AND DENTAL MEDICINE
CAIRO UNIVERSITY

2002



Supervisors

Prof. Dr. Said Mohamed Abd El-Aziz

Professor of Endodontics
Dean of faculty of Oral and Dental Medicine
Cairo University

Prof.Dr.Mohamed El-Batanouny

Professor of Surgery and Vascular Surgery
Faculty of Medicine
Head of Medical & Biological applications Department
(NILES)
Cairo University

Prof. Dr.Somiaa Abd El Latif

Professor of Microbiology
Faculty of Medicine
Cairo University

Acknowledgments

I would like to express my appreciation to *Prof.Dr.Said Mohamed Abd El Aziz*, Professor of Endodontics, Dean of Faculty of Oral and Dental Medicine, Cairo University, for his supervision, support and guidance throughout this study.

Special appreciation is extended to *Prof .Dr Mohamed Helmy El-Batanouny*, Professor of Surgery and Vascular Surgery, Faculty of Medicine, Head of Medical & Biological Applications Department, NILES, Cairo University for his continuous help and co-operation during the entire course of this work.

I would like to express my deepest thanks to *Prof.Dr .Somaia Abd El Latif*, Professor of Microbiology, Faculty of Medicine, Cairo University, for her valuable efforts, guidance and help.

I would like to thank all my professors of Endodontic Department, Faculty of Oral and Dental Medicine for their support and help.

I would like to thank all my colleagues of Endodontic Department for their help & co-operation.

Latifa Mohamed

Dedicated to

My parent, brothers and sisters for their unlimited love and care.

Contents

	Page
Introduction	1
Review of Literature	3
I-Laser physics	3
II-Laser tissue interactions	10
III-Bacteria of the study	14
IV-Antibacterial effect of sodium hypochlorite.....	18
V- Effect of the laser on microorganisms.....	23
VI-Comparative studies of direct effect of the laser versus sodium hypochlorite	30
Aim of the study	34
Materials&Methods	35
Results.....	44
Discussion.....	65
Summary&Conclusions.....	73
Recommendations.....	75
References.....	76
Appendix.....	87
Arabic summary	

List of Abbreviations

CO ₂	Carbon dioxide
Nd: YAG.....	Neodymium Yttrium Aluminum Garnet
KTP.....	Potassium Titanyl phosphate
He-Ne.....	Helium/Neon
Nd:YAP.....	Neodymium Yttrium Aluminum Perovskite
Nd:YAG	Neodymium Yttrium Aluminum Garnet
Er:YAG.....	Erbium Yttrium Aluminum Garnet
Ho: YAG.....	Holmium Yttrium Aluminum Garnet
GaAlAs.....	Gallium aluminum arsenide
CV.....	Crystal violet
TBO.....	Toluidine blue O
MB.....	Methylene blue
HPd.....	Hematoporphyrin derivate
ADP.....	Aluminum disulphonated Phthalocyanine
C.W.....	Continuous wave
nm.....	nanometer
W.....	watt
ul.....	micro litre
Sec.....	second
min.....	minute
CFUs.....	colony forming units
BPB.....	black pigmented bacteria
St	Streptococcus
S.....	Staphylococcus

Po.....Porphyromonas endodontalis
NaOcl.....Sodium hypochlorite
SDStander deviation
Temp.....temperature

List of tables

	Page
Table (1): Types of laser.....	9
Table (2): Classification of the samples according to the type of microorganism& the type of treatment.....	38
Table (3): The mean of the colony forming units, reduction% and significance effect of different treatments on <i>St. mitis</i>	49
Table (4): Root temperature before and after laser irradiation for 1 min in subgroup C.....	51
Table (5): Root temperature before and after laser irradiation and after irrigation in subgroup D.....	51
Table (6): The mean of the colony forming units, reduction % and significance of different treatments on <i>S. aureus</i>	55
Table (7): The mean numbers of the colony forming units, reduction % and significance of different treatments on <i>Porphyromonas endodontalis</i>	60
Table (8): comparison between hypochlorite group and laser groups in reducing the colony forming units in <i>St.mitis</i> , <i>S .aureus</i> and <i>Porphyromonas endodontalis</i>	64
Table (9): The mean number of colonies of <i>Streptococcus mitis</i> in different groups	86
Table (10): The mean number of colonies of <i>S .aureus</i> in different groups	87
Table (11): The mean number of colonies of <i>Porphyromonas endodontalis</i> in different groups	88

Table (12): Root temperature at the cervical, middle and apical thirds before and after laser irradiation for 1 min in laser alone group	89
Table (13): Root temperature at the cervical, middle and apical thirds before and after laser irradiation and after irrigation in laser with distilled water group	89

List of figures

	Page
Fig (1): A schematic diagram of the essential component of a laser.....	4
Fig (2): Stimulated emission & amplification occurring within the resonant cavity to produce the laser	4
Fig (3): Spontaneous & stimulated emission of radiation.....	6
Fig (4): Comparison of a laser and an ordinary light source.....	8
Fig (5): Laser tissue interactions.....	11
Fig (6): A photograph showing diode laser, LM.2500, Premier Laser Systems.....	35
Fig (7): A photograph showing fibro optic fiber 400 um.....	35
Fig (8): A photograph showing teeth before sectioning of crowns.....	36
Fig (9): A photograph showing teeth after sectioning of crowns.....	36
Fig (10): A photograph showing PYR-treated swabs.....	40
Fig (11): A photograph showing K/J electrical thermometer with thermocouple.....	43
Fig (12): A photograph showing Oxoid anaerobic jar used with a gas generating kit for Incubation of bacteria.....	43
Fig (13): A photograph showing gram positive Streptococcus mitis.....	45
Fig (14): A photograph showing gram positive Staphylococcus aureus	45
Fig (15): A photograph showing gram negative Porphyromonas endodontalis.....	46