

بسم الله الرحمن الرحيم





شبكة المعلومات الجامعية التوثيق الالكتروني والميكرو فيلم



جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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



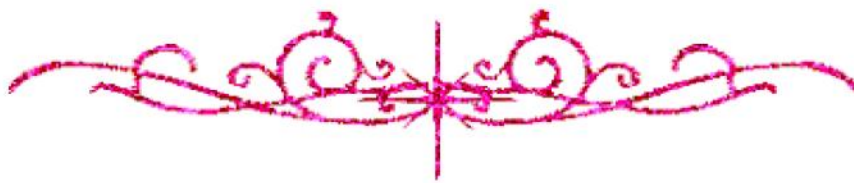
يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار





بعض الوثائق الأصلية تالفة





بالرسالة صفحات
لم ترد بالأصل





Comparison of the Effects of Femtosecond Laser Energy on Corneal Endothelium at Two Different Dissection Levels in Femtosecond Laser Assisted Deep Anterior Lamellar Keratoplasty for Keratoconus Patients

Thesis

*Submitted for Partial Fulfillment of M.D Degree in
Ophthalmology*

By

Mustafa Saber Hafez Mohamed Ali

*MB. BCh, M.Sc. of Ophthalmology
Faculty of Medicine, Ain Shams University*

Under Supervision of

Prof. Dr. Ismail Ibrahim Noureldin Hamza

*Professor of Ophthalmology
Faculty of Medicine, Ain Shams University*

Dr. Walid Mohamed Abd El Raouf El Zawahry

*Assistant Professor of Ophthalmology
Faculty of Medicine, Ain Shams University*

Dr. Ashraf Hassan Soliman

*Assistant Professor of Ophthalmology
Faculty of Medicine, Ain Shams University*

*Faculty of Medicine
Ain Shams University*

2020

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قالوا

سبحانك لا علم لنا
إلا ما علمتنا إنك أنت
العليم العظيم

صدق الله العظيم

سورة البقرة الآية: ٢٢

Acknowledgements

I would like to express my respectful thanks and profound gratitude to *Prof. Dr. Ismail Hamza*, Professor of Ophthalmology, Faculty of Medicine, Ain Shams University for being a true mentor, also for his keen guidance, kind supervision, valuable advice and continuous encouragement, which made the completion of this work possible.

I am deeply thankful to *Dr. Walid El-Zawahry*, Assistant Professor of Ophthalmology, Faculty of Medicine, Ain Shams University, for his supervision and cooperation in this work.

I am also delighted to express my deepest gratitude and thanks to *Dr. Ashraf Soliman*, Assistant Professor of Ophthalmology, Faculty of Medicine, Ain Shams University, for his kind care, continuous supervision, valuable instructions, constant help throughout this work and great assistance with data analysis and diagrammatic work.

I would like to acknowledge Durrah Specialized Eye Center for helping me throughout the process of this work.

Last but not least my sincere thanks and appreciation to all patients participated in this study, and to my dear colleagues who helped me collect the data.

Mustafa Saber Hafez



*To My Parents,
Wife &
Daughter*



CONTENTS

TITLE	PAGE NO.
List of Abbreviations	i
List of Tables	iii
List of Figures	v
Introduction	1
Aim of Work	4
Review of Literature	
Anatomy of the Cornea	5
Keratoconus	12
Keratoplasty	25
Femtosecond Laser	27
Specular Microscopy	31
Patients and Methods	36
Results	43
Discussion	65
Conclusion	73
Summary	75
References	77
Arabic Summary	

LIST OF ABBREVIATIONS

ABB.	FULL TERM
%Hex	Percentage of hexagonal endothelial cells
AC	Anterior Chamber
CCT	Central Corneal Thickness
CDVA	Corrected Distance Visual Acuity
CV	Coefficient of variation
D	Diopter
DALK	Deep Anterior Lamellar Keratoplasty
DM	Descemet's membrane
ECD	Endothelial cell density
ECM	Extracellular matrix
FLACS	Femtosecond laser-assisted Cataract Surgery
FLAK	Femtosecond laser-assisted Astigmatic Keratotomy
FSDALK	Femtosecond laser-assisted deep anterior lamellar keratoplasty
FSL	Femtosecond laser
FS-LASIK	Femtosecond laser-assisted Laser In-Situ Keratotomy
FS-SMILE	Femtosecond laser-assisted Small Incision Lenticule Extraction

LIST OF ABBREVIATIONS *CONT.*

ABB.	FULL TERM
<i>IOP</i>	Intraocular Pressure
<i>K max</i>	Maximum Keratometric power
<i>K mean</i>	Mean Keratometric power
<i>logMAR</i>	Logarithm of the Minimum Angle of Resolution
<i>M12</i>	12 th postoperative month
<i>M3</i>	3 rd postoperative month
<i>M6</i>	6 th postoperative month
<i>MMP</i>	Matrix Metalloproteinase
<i>PK</i>	Penetrating Keratoplasty
<i>UDVA</i>	Uncorrected Distance Visual Acuity

LIST OF TABLES

TABLE NO.	TITLE	PAGE NO.
1	Amsler-Krumeich classification for grading of keratoconus	16
2	The ABCD classification of keratoconus ..	17
3	Comparison of the demographic data in both groups	41
4	Comparison of the preoperative data in the two groups	42
5	Comparison of the FSL parameters in both groups	43
6	Comparison of the type of big bubble achieved in both groups	44
7	Comparison of the progression of the mean UDVA in both groups	45
8	Comparison of the progression of the mean CDVA in both groups	45

9	Comparison of the progression of the mean spherical error in both groups	47
10	Comparison of the progression of mean refractive cylinder in both groups	48

LIST OF TABLES *CONT.*

TABLE NO.	TITLE	PAGE NO.
11	Comparison of the progression of topographic astigmatism in both groups ...	50
12	Comparison of the progression of K mean in both groups	51
13	Comparison of the progression of K max in both groups	52
14	Comparison of the progression of mean ECD in both groups	55
15	Comparison of the mean postoperative	57

	ECD loss rate in both groups	
16	Comparison of the progression of the mean %Hex in both groups	59
17	Comparison of the progression of the mean CV in both groups	60
18	Comparison of the progression of the mean CCT in both groups	61
19	Comparison of the adverse effects in both groups	62

LIST OF FIGURES

FIGURE NO.	TITLE	PAGE NO.
1	Light microscopic picture of normal corneal anatomy	7
2	Electron microscopy of the Dua's Layer.....	8