بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

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

MONA MAGHRABY

Fractional carbon dioxide laser, platelet – rich plasma and narrow band ultraviolet B in the treatment of Vitiligo (A prospective randomized comparative trial)

Thesis

Submitted for Partial Fulfillment of Master Degree in Dermatology, Venereology and Andrology

Presented By

Mohamed Abdullah Eshafi

M.B. B.Ch.

Under Supervision of

Prof. Dr. Nehal Mohamed Zuelfakkar

Professor of Dermatology, Venereology and Andrology
Faculty of Medicine - Ain Shams University

Dr. Ahmed Abd Elfattah Afify

Lecturer of Dermatology, Venereology and Andrology
Faculty of Medicine - Ain Shams University

Faculty of Medicine
Ain Shams University
2020

سورة البقرة الآية: ٣٢

Acknowledgment

First and foremost, I feel always indebted to **ALLAH**,
the Most Kind and Most Merciful.

I'd like to express my respectful thanks and profound gratitude to ***Prof. Dr. Nehal Mohamed Zuelfakkar,*** *Professor of Dermatology, Venereology and Andrology Faculty of Medicine - Ain Shams University for her keen guidance, kind supervision, valuable advice and continuous encouragement, which made possible the completion of this work.*

I am also delighted to express my deepest gratitude and thanks to ***Dr. Ahmed Abd Elfattah Afify,*** *Lecturer of Dermatology, Venereology and Andrology Faculty of Medicine - Ain Shams University, for his kind care, continuous supervision, valuable instructions, constant help and great assistance throughout this work.*

Thanks for all staff members of dermatology, venereology and andrology department, Ain shams university for their support.

Mohamed Eshafi

List of Contents

List of Abbreviations

Abb.	Full term
µ	Micro
µm	Micrometer
AEs	Adverse events
AGEs	Advanced glycation end-products
AOPPs	Advanced oxidation protein products
bFGF	basic fibroblast growth factor
CAT	Catalase
CD	Cluster of differentiation
CDK4	Cyclin Dependent Kinase-4
CO2	Carbon dioxide
CTLA4	Cytotoxic T Lymphocyte Antigen 4
CXCL	C-X-C motif
CXCR	C-X-C motif receptor
DAMPs	Damage-associated molecular patterns
DCs	Dendritic cells
DHA	Dihidroxyacetone
EGF	Epidermal Growth Factor
ET-1	Endotheline - 1
FDA	Food and Drug Administration
FGF	Fibroblast Growth Factor
Fr:CO2	Fractional carbon dioxide
g/dl	Grams Per Decilitre
GFs	Growth factors
H2O2	Hydrogen peroxide
Hcy	Homocysteine
HGB	Hemoglobine
HGF	Hepatocyte Growth Factor
HIV	Human immunodeficiency virus
HLA	Human Leukocyte Antigen
IBD	Inflammatory Bowel Disease
IBS	Irritable bowel syndrome
ICAM-1	Intra cytoplasmic adhesion molecule 1
IFN	Interferon
IFN-γ	Interferon gamma
IFN-γR	Interferon gamma receptor

List of Abbreviations Cont...

Abb.	Full term
IgA	Immunoglobulin A
IgG	Immunoglobulin G
IgM	Immunoglobulin M
IL	Interleukin
IL1-α	Interleukin 1 alpha
JAK	Janus kinase
KP	Koebner's phenomenon
laser	Fractional carbon dioxide laser
MBEH	Mono-benzyl ether of hydroquinone
MCH	Melanin concentrating hormone
MCHR1	Melanin concentrating hormone receptor 1
mg	Milligram
MHC	Major histocompatibility complex
mL	Mlilliliter
mm	Millimeter
NALP1	NACHT-LRR-PYD-containg protein 1
NB-UVB	Narrowband ultraviolet B
NCES	Non-cultured epidermal cell suspension
NK	Natural killer
nm	Nanometer
NSAIDs	Nonsteroidal anti-inflammatory drugs
NSV	Non segmental vitiligo
PDGF	Platelet-derived growth factor
PG	Punch Grafting
PPP	Platelet-poor plasma
PRP	Platelet-rich plasma
PRRs	Pattern recognition receptors (PRRs)
PTPN22	Protein Tyrosine Phosphatase Non Receptor Type 22
PUVA	Psoralen with ultraviolet A
QoL	Quality of life
QSR	Qswitched ruby
ROS	Reactive oxygen species
SCF	Stem cell factor
SLE	Systemic Lupus Erythematosus
SOD	Superoxide dismutase

List of Abbreviations Cont...

Abb.	Full term
STAT	Signal transducer and activator of transcription
SV	Segmental vitiligo
TGF	Transforming Growth Factor
TNF	Tumour necrosis factor
TNF-α	Tumour necrosis factor-alpha
TNF-β	Tumour necrosis factor-beta
Tregs	Regulatory T cells
Tyk2	Tyrosine kinase 2
ul	Microliters
UV	Ultraviolet
UVA	Ultraviolet A rays
UVB	Ultraviolet B rays
VASI	Vitiligo Area Scoring Index
VEGF	Vascular Endothelial Growth Factor
VETF	Vitiligo European Task Force
VIDA	Vitiligo Disease Activity Score
WBCs	White blood cells
XE – C1	Xenon-Chlorine
α-MSH	α-melanocyte-stimulating hormone

List of Tables

List of Figures

List of Figures Cont...

INTRODUCTION

Vitiligo is a chronic systemic acquired disease that has an unpredictable clinical course, characterized by the appearance of macules and achromic or hypochromic patches on the skin and mucous membranes due to the disappearance of melanocytes in the affected area ***(Tarlé et al., 2014).***

The prevalence of vitiligo is less than 2% worldwide ***(Ghafourian et al., 2014).*** Vitiligo may develop at any age, but most people develop the disease before the age of 20 years ***(Li et al., 2017).***

The cause of vitiligo is not fully understood. There are a few major hypotheses for the pathogenesis of vitiligo which include the genetic, neural, autoimmune, biochemical, and melanocytorrhagy theories ***(Choi et al., 2014).***

The mode of re-pigmentation in vitiligo involves reactivation of the melanocytes located in the outer root sheath of the hair follicles or from the contiguous pigmented skin in which melanocytes migrate about 2–3 mm into the de-pigmented skin ***(Anbar et al., 2006).***

Therapeutic strategies for vitiligo include nonsurgical and surgical methods. Nonsurgical options like psoralen and ultraviolet A (PUVA), narrow-band ultraviolet B (NB-UVB), corticosteroids, topical calcipotriol, and tacrolimus. Surgical

methods such as skin grafting, autologous cultured melanocyte, or epidermal suspension transplantations ***(Mina et al., 2018).***

NB-UVB phototherapy is considered to be a very important modality in vitiligo treatment since it is use in 1997 ***(Yuan et al., 2016).***

NB-UVB phototherapy utilizes ultraviolet radiation in the specific wavelength range of 311-312 nm and is an important treatment modality in a number of dermatological conditions ***(Sokolova et al., 2015).***

Fractional CO2 (Fr:CO2) laser is a treatment modality that depends on thermal injury zones surrounded by normal skin. Fr: CO2 laser proved effective in the treatment of refractory non-segmental vitiligo in combination with NB-UVB ***(El-Zawahry et al., 2017).***

Platelet-rich plasma (PRP) is composed of high concentration of platelets with high concentration of growth factors (GFs). This may help in stimulation of the proliferation of melanocytes and repigmentation within vitiliginous patches ***(Kadry et al., 2018).***