

**Comparative Study in Treatment of Nail psoriasis
Using Pulsed Dye Laser and Long Pulsed Nd:
YAG 1064 nm Laser: Dermoscopic Evaluation**

A Thesis

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

By

Hussein Mohsen Mohammed Mohammed

(M.B;B.Ch)

Faculty of Medicine - Mansoura University

Supervised by

Prof.Dr.Hoda Ahmed Mohammed Moneib

Porfessor of Dermatology, Venereology and Andrology,

Faculty of Medicine - Ain Shams University

Prof. Dr. Ranya Adel Lotfi

Porfessor of Dermatology, Venereology and Andrology,

Faculty of Medicine - Ain Shams University

*Faculty of Medicine
Ain Shams University*

2017

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ وَكَانَ

فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا﴾

صدق الله العظيم
سورة النساء آية (١١٣)

Acknowledgment

*First of all thanks to **Allah** who gave me the opportunity and the power to finish this work*

This thesis becomes a reality with the kind support and help of many individuals. I would like to extend my sincere thanks to all of them.

*First of all, I would like to express my deepest sense of gratitude to my supervisor **Prof. Dr. Hoda Ahmed Mohammed Moneib**, Professor of Dermatology, Venereology and Andrology, Faculty of Medicine - Ain Shams University who offered her continuous advice and encouragement throughout the course of this thesis. I thank her for the systematic guidance and great effort she put into training me in the scientific field.*

*I am deeply indebted to **Prof. Dr. Ranya Adel Totfi**, Professor of Dermatology, Venereology and Andrology, Faculty of Medicine - Ain Shams University for her stimulating suggestions, cooperation and endless effort in all the time of the research and writing of this thesis.*

*I couldn't forget **Prof. Dr. Mohammed Saad Hegazy** professor and head of Dermatology, Venereology and Andrology department at Kobbry elKobba military hospital, I am deeply touched by his endless support and concern.*

Special thanks to my colleagues and all members of dermatology and venerology their support and the home feeling whenever I was in need.

Hussein Mohsen Mohammed

Dedication

"I don't know what your destiny will be, but one thing I know: the only ones among you who will be really happy are those who will have sought and found how to serve."

Albert Schweitzer

For those who answer the call in the middle of the day or night. For those who answer the call for help with no expectation of personal gain.

This work is dedicated to my great **parents**, **my family** who have always been so close to me whenever I needed. Their unconditional love motivates me to set higher targets. They have successfully made me the person I am becoming.

I also dedicate this work to my beloved wife **Hend**. I take this opportunity to express the profound gratitude from my deep heart to her. Every moment I spend with her reminds me of how lucky I am. No one can understand me as well as she does. If there was any one on this planet who could make my life complete in every way, it has to be her and only her.

List of Contents

Title	Page No.
List of Tables	i
List of Figures.....	iii
List of Abbreviations	viii
Introduction	1
Aim of the Work	5
Review of Literature	
▪ Psoriasis	6
▪ Light Therapy	46
▪ Dermoscopy	74
Subjects and Methods.....	82
Results	92
Case Presentations	117
Discussion.....	127
Summary	137
References	141
Arabic Summary	

List of Tables

Table No.	Title	Page No.
Table (1):	The role of cytokines produced by keratinocytes and T lymphocytes in psoriasis.....	24
Table (2):	PDL for treatment of nail psoriasis.	57
Table (3):	Vascular structures seen by dermoscopy.	77
Table (4):	Dermoscopic findings of the nail plate in nail psoriasis.....	79
Table (5):	Steps of assessment of PASI score	85
Table (6):	Sheet of assessment of NAPSII score used in this study.....	87
Table (7):	The demographic and clinical characteristics of the studied cases.....	92
Table (8):	Correlation between PASI score and total NAPSII at baseline (0 month).	93
Table (9):	Correlation between NAPSII score and count of dilated blood vessels under dermoscope.	94
Table (10):	Mean nail matrix NAPSII score at 0, 3 and 7 months in group treated by PDL.....	95
Table (11):	Mean nail bed NAPSII score at 0, 3 and 7 months in group treated by PDL.....	96
Table (12):	Comparison between mean nail matrix vs. nail bed scores in group treated by PDL.	97
Table (13):	Mean total NAPSII score at 0, 3 and 7 months in group treated by PDL.....	98
Table (14):	Mean matrix NAPSII score at 0, 3 and 7 months in group treated by Nd:YAG.....	99
Table (15):	Mean nail bed NAPSII score at 0, 3 and 7 months in group treated by Nd:YAG.....	100
Table (16):	Comparison between mean nail matrix vs. nail bed scores in group treated by Nd:YAG.	101
Table (17):	Mean total NAPSII score at 0,3 and 7 months in group treated by Nd: YAG.	102

List of Tables cont...

Table No.	Title	Page No.
Table (18):	Comparison between Nd:YAG and PDL regarding mean nail matrix NAPI score at 0, 3 and 7 month.....	103
Table (19):	Comparison between Nd:YAG and PDL regarding mean nail bed NAPI score at 0, 3 and 7 month.....	104
Table (20):	Comparison between Nd:YAG and PDL regarding mean total NAPI at 0, 3 and 7 month.....	105
Table (21):	Comparison between count of dilated blood vessels before and after treatment in Nd:YAG group by DS.	107
Table (22):	Comparison between count of dilated blood vessels before and after treatment in PDL group by DS.	108
Table (23):	Comparison between Nd:YAG and PDL regarding no of blood vessels under DS before treatment.....	109
Table (24):	Comparison between Nd:YAG and PDL regarding blood vessels after treatment evaluation by DS.	110
Table (25):	Correlation between NAPI score and degree of improvement.....	111
Table (26):	Comparison between Nd:YAG and PDL groups regarding degree of improvement.	112
Table (27):	Comparison between Nd:YAG and PDL regarding complications after treatment.	113
Table (28):	Comparison between Nd:YAG group and PDL group regarding level of patients satisfaction.	116

List of Figures

Fig. No.	Title	Page No.
Figure (1):	Histopathology of psoriasis.....	12
Figure (2):	Key cells and mediators of innate and adaptive immunity in psoriasis.....	13
Figure (3):	Immunopathogenesis of psoriasis.....	14
Figure (4):	Pathways engaged by IL-12 and IL-23	15
Figure (5):	T cell activation.....	21
Figure (6):	Steps of skin infiltration by T cells.....	23
Figure (7):	Role of IL-22 and 23 in psoriasis.....	26
Figure (8):	Finger nail structure.....	27
Figure (9):	Psoriatic arthritis	32
Figure (10):	Nail pitting in psoriasis.....	33
Figure (11):	Oil drops.....	34
Figure (12):	Subungual hyperkeratosis	35
Figure (13):	Onycholysis.....	35
Figure (14):	Splinter haemorrhages.....	36
Figure (15):	Thickening of the nail plate.....	36
Figure (16):	Pustular psoriasis of the nails.....	37
Figure (17):	Onychomycosis.....	38
Figure (18):	<i>Psoriasis</i> : homogenous red dots (blood vessels) within pink patches.....	79
Figure (19):	Onycholysis.....	80
Figure (20):	Splinter hemorrhages	80
Figure (21):	The European Medicines Agency (EMA) definition of mild, moderate, and severe psoriasis	85
Figure (22):	Sony digital camera, Adaptor and Dermoscope.	88
Figure (23):	Gender distribution among the studied cases.....	92
Figure (24):	Correlation between PASI and total NAPSI score at baseline.....	93

List of Figures cont...

Fig. No.	Title	Page No.
Figure (25):	Correlation between NAPSI score at baseline and count of blood vessels under dermoscope.	94
Figure (26):	Mean matrix NAPSI score at 0, 3 and 7 months in group treated by PDL	95
Figure (27):	Mean bed NAPSI score at 0, 3 and 7 months in group treated by PDL.	96
Figure (28):	Comparison between mean nail matrix vs. nail bed scores in group treated by PDL	97
Figure (29):	Mean total NAPSI score at 0,3 and 7 months in group treated by PDL.	98
Figure (30):	Mean matrix NAPSI score at 0, 3 and 7 months in group treated by Nd:YAG.....	99
Figure (31):	Mean nail bed NAPSI score at 0, 3 and 7 months in group treated by Nd:YAG.	100
Figure (32):	Comparison between mean nail matrix vs. nail bed scores in group treated by Nd:YAG.....	101
Figure (33):	NAPSI score at 0,3 and 6 months in group treated by Nd: YAG.....	102
Figure (34):	Comparison between Nd:YAG and PDL regarding mean nail matrix NAPSI score at 0, 3 and 7 month.	103
Figure (35):	Comparison between Nd:YAG and PDL regarding mean nail bed NAPSI score at 0, 3 and 7 month.	104
Figure (36):	NAPSI score in the two groups at 0, 3 and 7 m.	106
Figure (37):	NAPSI score in the two groups at 0, 3 and 7 m.	106
Figure (38):	Count of blood vessels before and after treatment in Nd:YAG group under DS.	107

List of Figures cont...

Fig. No.	Title	Page No.
Figure (39):	Count of blood vessels before and after treatment in PDL group under DS.....	108
Figure (40):	Number of dilated tortous Blood vessels in the two groups before treatment.....	109
Figure (41):	Dilated blood vessels in the two groups before treatment evaluation by DS.	110
Figure (42):	Negative correlation between NAPSII score and degree of improvement.	111
Figure (43):	Comparison between Nd:YAG and PDL groups regarding degree of improvement.	112
Figure (44):	Comparison between Nd:YAG and PDL regarding pain.....	114
Figure (45):	Comparison between Nd:YAG and PDL regarding pigment.....	114
Figure (46):	Comparison between Nd:YAG and PDL regarding pitechie.	115
Figure (47):	Comparison between before and after treatment in PDL group and Nd:YAG group regarding level of patient's satisfaction.....	116
Figure (48):	A,B) Severe clinical improvement in psoriatic nail (A) showing nail pitting which is depression, subungular hyperkeratosis. (B) showing improvement. (C) showing under dermoscope (pitting as a depressions that are irregular both in shape and size, surrounded by a whitish halo depression(D) shows improvement and (E)show dermoscopy of hyponychium at 70x showed dilated, tortous capillaries. (F) shows marked decrease in number of these capillaries.	118

List of Figures cont...

Fig. No.	Title	Page No.
Figure (49):	A,B) Clinical improvement in psoriatic nail (A) shows nail pitting, subungular hyperkeratosis, oily spot.(B) show severe improvement.(C) showing under dermoscope (pitting as a depression. (D) shows improvement and(E)Dermoscopic of hyponychium at 40x showed dilated, tortous capillaries. (F) shows marked decrease in number of these capillaries.	119
Figure (50):	A,B) Clinical improvement in psoriatic nail (A) shows nail pitting, subungular hyper keratosis and brittle nails (B) shows improvement (C) shows under dermoscope (pitting as a depression).(D) shows severe improvement. (E) Dermoscopic of hyponychium at 70x showed dilated, tortous capillaries. (F) decrease in number of these capillaries.....	120
Figure (51):	A,B) Clinical improvement in psoriatic nail (A)shows oily spot. (B) shows improvement (C)showing under dermoscope (pitting as a depression and oile spot. (D) shows improvement and(E)Dermoscopic of hyponychium at 40x showed dilated, tortous capillaries (F) shows marked decrease in number of these capillaries.	121
Figure (52):	A,B) Moderate clinical improvement in psoriatic nail (A) shows nail pitting, subungular hyperkeratosis,(B) shows improvement &(C) showing under dermoscope (pitting as a depression).(D) shows improvment. (E)Dermoscopic of hyponychium at 40x showed dilated, tortous capillaries. (F) shows decrease in number of these capillaries.....	123

List of Figures cont...

Fig. No.	Title	Page No.
Figure (53):	A,B) Moderate clinical improvement in psoriatic nail (A) shows nail pitting, subungular hyperkeratosis, and oily spot.(B) shows improvement.(C,D)showing under dermoscope and (E)Dermoscopic of hyponychium at 70x showed dilated, tortous capillaries. (F) shows decrease in number of these capillaries.	124
Figure (54):	A,B) Moderate clinical improvement in psoriatic nail (A) shows nail pitting, subungular hyperkeratosis. (B) shows improvement and (C,D) showing under dermoscope.(E) Dermoscopic of hyponychium at 70x showed dilated, tortous capillaries. (F) shows decrease in number of these capillaries.	125
Figure (55):	A,B) Moderate clinical improvement in psoriatic nail (A) shows nail pitting, subungular hyperkeratosis atrophied nail crumpling brittle nail(B) shows improvement and (C,D) showing under dermoscope. (E) shows Dermoscopic of hyponychium at 70x showed dilated, tortous capillaries.(F) showing decrease in number of these capillaries.	126

List of Abbreviations

Abb.	Full term
Abbreviation	Full term
A	Alpha
B	Beta
Γ	Gamma
A.A	Arachidonic acid
Ag	Antigen
AMPs	Antimicrobial peptides
AP	Activator protein
APC	Antigen presenting cell
BCC	Basal cell carcinoma
BSA	Body surface area
CCL / CXCL	Chemokine
CCR / CXCR	Chemokine receptor
CD	Cluster of differentiation
CLA	Cutaneous lymphocyte associated antigen
CTACK	Cutaneous T-cell Attracting Chemokine
DC	Dendritic cell
DNA	Deoxyribonucleic acid
DLSO	Distal and distal-lateral subungual onychomycosis
DPN	Dermatosis papulosa nigra
EGF-R	Epidermal growth factor receptor
EMA	European Medicines Agency
FU	Fluorouracil
GM-CSF	Granulocyte macrophage colony stimulating factor
HBD	Human b-defensin
HEV	High endothelial venule
HIV	Human immune deficiency virus
HLA	Human leukocyte antigen

Abbreviation	Full term
H-pylori	Helicobacter pylori
HSP	Heat shock protein
ICAM	Intercellular adhesion molecule
IFN	Interferon
Ig	Immunoglobulin
IGF	Insulin like growth factor
IL	Interleukin
ILVEN	Inflammatory linear verrucous epidermal nevus
iNOS	Inducible nitric oxide synthase
IPL	Intense pulsed light
KGF	Keratinocyte growth factor
LFA	Lymphocyte function associated antigen
MC	Molluscum contagiosum
MHC	Major histocompatibility complex
MIP	Macrophage inflammatory protein
mRNA	Messenger ribonucleic acid
NAPSI	Nail psoriasis severity index
NF κ β	Nuclear factor kappa beta
NGF	Nerve growth factor
NK	Natural killer cell
P acnes	Propioni-bacterium acnes
PASI	Psoriasis area and severity index
PDL	Pulsed dye laser
PDT	Photodynamic therapy
PNF	Proximal nail fold
PPP	Palmoplantar pustulosis
PSORS	Psoriasis susceptibility
PUVA	UVA + oral psoralen (Photo-chemotherapy)
PWS	Port-wine stain
SD	Standard deviation
SLPI	Secretory leukocyte protease inhibitor
STAT	Signal Transducer and Activator of Transcription
TCM	Central memory T cell

Abbreviation	Full term
TCR	T cell receptor
TE	Effector T cell
TEM	Effector memory T cell
Tgase	Transglutaminase
TGF	Transforming growth factor
Th	Helper T cell
TLR	Toll-like receptor
TNF	Tumour necrosis factor
Treg	Regulatory T cell
UV	Ultraviolet
VCAM	Vascular cell adhesion molecule
VEGF	Vascular endothelial growth factor
VIP	Vasoactive intestinal peptide
VLA	Very late antigen
VV	Verruca vulgaris
LED	Light emitting diodes
DLE	Discoid lupus Erthromatosus
CTD	Connetive tissue disease
HPV	Human papilloma virus
CPL	Contact plate lens
PN	Pigmented network
CMM	Cutaneous malignant melanoma
NS	non significant
S	Significant
HS	Highly significant
Nd:YAG	Neodymium-doped yttrium aluminium garnet