Evaluation of the response of Fractional Carbon Dioxide (CO2) Laser and Punch Elevation Technique in Treatment of Acne Scars: A split-face comparative clinical, histopathological,and immunohistochemical study

An M.Sc. Thesis

Submitted to the Department of Dermatology, Venereology, and Andrology,

Faculty of Medicine, Ain Shams University

In partial fulfillment of Master degree in Dermatology, Venereology, and Andrology

Prepared by

Seif –Allah MOHAMED REFAAT EL-FIKY, MBBCh

Under the Supervision of

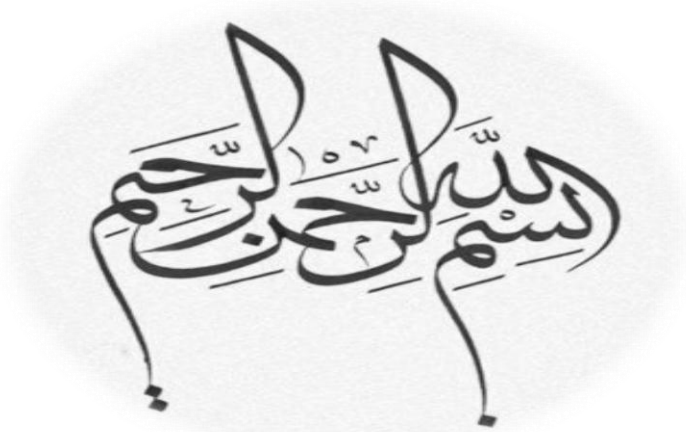
Prof. Dr. Sahar El-Sayed Ahmed
Professor of Dermatology, Venereology, and Andrology,
Faculty of Medicine,Ain Shams University

Prof. Dr. Manal Hassan Moussa
Professor of Histology, Faculty of Medicine, Ain Shams University

Dr. Rania Mahmoud Elhusseiny
Lecturer of Dermatology, Venereology, and Andrology,
Faculty of Medicine,Ain Shams University

Ain Shams University

(2017)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ACKNOWLEGEMENT

It has been my good fortune to carry out this work under the supervision of **Prof. Dr. Sahar El-Sayed Ahmed** , Professor of Dermatology, Venereology, and Andrology, Faculty of Medicine, Ain Shams University, who kindled my interest in the subject of the present study, in comprehensive approach and to whom I am grateful for her support, encouragement and constant guidance that helped me through the whole period of the study.

I am deeply grateful to **Prof. Dr. Manal Hassan Moussa ,** Professor of Histology, Faculty of Medicine, Ain Shams University. Her expertise in the field of Histology has set the standards on the subject of the presented study , without which anyone interested in the topic would be lacking.

My thanks also to **Dr. Rania Mahmoud Elhusseiny ,** Lecturer of Dermatology, Venereology, and Andrology, Faculty of Medicine,Ain Shams University. I enjoyed a full reading of the whole work from start to end of the study , The positive impact of her extensive help , archival information, and personal understanding are undeniable.

Finally, I extend my thanks to **Dr. Ahmed El_Beltagy** , assistant Lecturer of Dermatology, Venereology,and Andrology, Faculty of Medicine,Ain Shams University, who so generously gave his time , efforts and guidance. This study has not been possible without his super help.

Seif-Allah M.R.Elfiky

CONTENTS

LIST of ABBREVIATIONS

AP	**Activator Protein**
ASR	**Ablative Skin Resurfacing**
CO_2	**Carbon Dioxide**
ECCA scale	**Evaluation Clinique des Cicatrices d'acne**
EGF	**Epidermal Growth Factors**
Er.-YAG	**Erbium Yttrium Aluminum Garnet**
FGF	**Fibroblast Growth Factor**
FP	**Fractional Photothermolysis**
FT	**Fractional Thermolysis**
H & E	**Hematoxin and Eosin**
HSV	**Human immuno-Suppressing Virus**
IL	**Interleukin**
MENDs	**Microscopic Epidermal necrotic Debris**
MMPs	**Matrix Metallo-Proteinases**
MTZs	**Micro-Thermal Zones**
NDR	**Non-ablative Dermal Remodeling**

Nd-YAG	**Neodymium – doped Yttrium Aluminum Garnet**
NRS	**Numerical Rating Scale**
O_2	**Oxygen**
P.acne	**Propionibacterium acne**
PAMPs	**Pathogen-Associated Molecular Patterns**
PC	**Personal Computer**
PPAR	**Peroxisome Proliferator-Activated Receptors**
PRP	**Platelet-Rich Plasma**
Punch/Frac CO_2	**Punch Elevation technique, combined with Fractional CO_2 laser treatment**
" r "	**correlation coefficient**
RF	**Radio Frequency**
RNase	**Ribo Nuclease enzyme**
SD	**Standard Deviation**
SPF	**Sun Protection Factor**
SSPS	**Statistical Package for Scocial Science**

T-cells	**Tissue mediated immune cells**
TCA	**Tri-Chloro-Acetic Acid**
TIMPs	**Tissue Inhibitor of Matrix metallo-Proteins**
TNF	**Tumor Necrosis Factor**
TH	**Tissue Helper**
TLRs	**Toll-Like Receptors**
VEGF	**Vascular Endothelium Growth Factor**
YSGG	**Yttrium - Scandium - Gallium - Garnet**

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Abstract

Background : Acne is the most common skin disease affecting adolescents and young adults, with associated scarring and its sequelae. Treatment options are either lifting procedures raising scar base closer to normal skin surface, or resurfacing ones injuring epidermis and superficial dermis with neocollagenesis and epidermal repair. Punch elevation(PE) method is better for improving deep atrophic acne scars ,that can be combined with depth resurfacing. CO_2 laser stimulates new collagen formation , tightens skin and raises scar to surface. **Aim of the work:** to assess efficacy and safety of combination of PE technique and fractional co_2 laser (Fr co_2 L) compared to fr co_2 L alone. **Subjects and Methods** : 20 atrophic post acne scars patients were subjected to history taking, general and dermatological examinations, identifying scars types and grades. Treatment response at start , before each fr. co2 L session and 4 weeks after last laser session was clinically evaluated by Goodman and Baron scale, and recording patients' photographs, satisfaction, and complications.Histopathological examination of scar skin biopsies before and 4 weeks after the last fr. co_2 L session was done using H&E, Mallory trichome, sliver stain and immunehistochemical VEGF. **Results**: combined treatment with fr co2 L and PE was more effective in improving post acne scars than fr. co2 L resurfacing alone.Histopathological examination before combined fr. co_2 L and PE treatment and 1 month after the last fr. co_2 L session showed high significant increase in epidermal thickness (H&E), increase in collagen fiber type III (Mallory trichrome stain), decrease in collagen fiber type I (sliver stain) and increase in fibroblasts'activity (VEGF).**Conclusion:** both PE technique and fr. co_2 L resurfacing show promising efficacy and safety in treating atrophic post acne scars, complementing each other to improve skin texture and appearance, with excellent cosmetic outcomes.

Key words : Acne scar, Punch elevation, Fractional CO_2 Laser, Efficacy, Safety.