

**A comparative study between
trichloroacetic acid (TCA) 35% chemical
peeling and non ablative Nd:YAG laser
1064nm resurfacing in treatment of facial
wrinkles**

Thesis

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

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2013

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿وَعَلَّمَكَ مَا لَمْ تَكُنْ تَعْلَمُ وَكَانَ
فَضْلُ اللَّهِ عَلَيْكَ عَظِيمًا﴾

صدق الله العظيم

سورة النساء آية (١١٣)

Acknowledgement

*First of all, I thank **Allah** the source of all knowledge, for blessing this work till it has reached its end as a part of his generous gifts throughout my life.*

*My endless gratitude and appreciation to **Dr. Samar Abdallah M. Salem**, Professor of Dermatology, Venereology and Andrology, Ain Shams University, for her valuable instructions, generous help, unlimited support and effort to get best out of this work, Her scientific advices were kindly given to me and are beyond acknowledgement. This is besides her encouragement and her energetic help throughout the course of this work, I would like to thank her for spending much of her precious time, offering all the facilities to finalize this work,*

*I am greatly indebted and grateful to **Dr. Nermeen Samy Abdel Fattah**, Assistant Professor of Dermatology, Venereology and Andrology, Faculty of Medicine, Ain Shams University, for her instructive guidance, sincere supervision, her everlasting support, honest encouragement, help, and for offering me much of her valuable time and effort during the progress and production of this thesis.*

Nesreen

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List of Abbreviations

Abb.	Full term
AHA	Alpha hydroxyacids
BCC	Basal cell carcinoma
BTX	Botulinum toxins
CdK	Cycline dependent kinases
CO₂ lasers	Carbon dioxide lasers
CSC	Cryogen spray cooling
DEJ	Dermo-epidermal junction
DHEA	Dihydroepiandrosterone
DHEAS	Dihydroepiandrosterone sulfate ester
DNA	Deoxyribonucleic acid
DOPA	Dihydroxyphenylalanine
ECM	Extracellular matrix
Er:YAG	Erbium-doped: Yttrium-Aluminum-Garnet
FP	Fractional photothermolysis
GAG	Glycosaminoglycans
H&E stain	Hematoxyline and eosine stain
Hz	Hertz
J/cm²	Joule percentimeter square
KTP	Potassium titanyl phosphate
Laser	Light amplification by stimulated emission of radiation
LCs	Langerhans cells
MED	Minimal erythema dose
MMPs	Matrix metalloproteinases
Msec	Millisecond
MTZs	Microscopic treatment zones

Nd: YAG.....	Neodymium-doped: Yttrium-Aluminum-Garnet
Nm	Nanometer
PABA.....	Para-aminobenzonic acid
PDL	Pulsed dye laser
PMMA.....	Polymethylmethacrylate
QS Nd:YAG.....	Quality switched Neodymium-doped: Yttrium-Aluminum-Garnet
RF	Radiofrequency
ROS	Reactive oxygen species
SCC.....	Squamous cell carcinoma
SPF	Sunprotection factor
TCA	Trichloroacetic acid
TIMPS.....	Tissue inhibitors of metalloproteinases
TPL.....	Intense-pulsed light
TRT	Thermal relaxation time
US	Ultrasonography
UV	Ultraviolet light
UVA	Ultraviolet rays type A
UVB	Ultraviolet rays type B
VGG Stain	Verhoeff-VanGieson stain

INTRODUCTION

Wrinkles, also known as rhytides, may be defined as creases or furrows in the skin surface, especially noticeable on the face, neck and hands, reflecting the underlying alterations in the delicate architecture of the dermal connective tissue, namely the collagen and elastic fibers. These are responsible for the maintenance of the normal skin turgor and elasticity (*Samuel et al., 2005*). They are the product of the ageing process, facial muscle contraction, sun damage & smoking (*Goldberg and Samady, 2001*).

Age is the most significant factor contributing to the overall change in the appearance of an individual's facial features over time. This gradual process of structural weakening of the face begins during the third decade and continues to worsen during the remainder of an individual's lifetime (*Defatta and Williams, 2009*).

Various modalities have been used to treat facial wrinkles. These include ablative as well as non-ablative procedures. Dermabrasion, chemical peels and resurfacing lasers are the current mainstays of ablative facial resurfacing (*Samuel et al., 2005*).

During ablative facial resurfacing process, the epidermis is denuded to a certain depth by the direct physical, chemical or thermal injury applied to the skin (*Grey, 2004*). Thereafter, the

ablative cutaneous injury promotes epidermal regeneration and collagen remodeling with excellent clinical results. However, interest in these therapies has waned significantly in recent years because of the substantial post-treatment "downtime" and prolonged recovery period (***Kim and Geronemus, 2004***).

In contrast to ablative rejuvenation procedures, non-ablative laser rejuvenation procedures induce a dermal healing response without notable injury to the epidermis.

The exact mechanisms of non-ablative dermal remodeling are still under investigation; however, a subthreshold laser induced injury to the dermis and/or the dermal vasculature theoretically results in wound repair response, fibroblast stimulation and collagen formation (***Newman, 2003***).

Currently, lasers in the mid-infrared range provide the best choice for safe non-ablative resurfacing on skin types.

These includes the 1320-nm Nd:YAG laser and the 1064-nm Nd:YAG laser (***Herron et al., 2004 and Kopera et al., 2004***).

AIM OF THE WORK

The aim of this study is to compare chemical peeling by TCA with the non-ablative 1064nm Nd:YAG laser for treatment of facial wrinkles.