Microneedling with and without Vitamin C versus Fractional CO_2 LASER in Treating Abdominal Striae Distensae Alba: A Comparative Clinical and Histopathological Study

Thesis

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Amira Samy Abdelsamiea

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List of Abbreviations

Abbr.	Full term
BMI:	Body Mass Index
BW:	Birth Weight
cm^2:	Centimeter Square
Co_2	Carbon Dioxide
EMLA:	Eutectic Mixture of Local Anesthesia
Er-YAG:	Erbium-doped yttrium aluminum garnet
gm:	Gram
H&E:	Hematoxylin and Eosin
IPL:	Intense Pulsed Light
IQR:	Interquartile range
J:	Joule
LASER:	Light Amplification by Stimulated Emission of Radiation
LFE:	Linear Focal Elastosis
m RNA:	Messenger RNA
mg:	Milligram
mj:	Millijoule
ml:	Milliliter
mm:	Millimeter
ms:	Millisecond

n:..... Number

Nd yag:.....Neodymium-Doped yttrium aluminum garnet

nm: ..... Nanometer

PCI:..... Percutaneous Collagen Induction

PDL:..... Pulsed dye LASER

PIH:..... Post-Inflammatory Hyperpigmentation

SD:..... Standard deviation

SG: ..... Striae Gravidarum

SPSS:.....Statistical Package for the Social Sciences

TGF-β:……..Transforming Growth Factor Beta

TRT: ..... Thermal Relaxation Time

UV:..... Ultraviolet

µj: ..... Microjoule

µm: ..... Micrometer

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INTRODUCTION

Striae distensae, a common skin condition, represent linear dermal scars accompanied by epidermal atrophy ***(Chang et al., 2004).***

Striae distensae affect skin that is subjected to continuous and progressive stretching, increased stress is placed on the connective tissue due to increased size of the various parts of the body ***(Forbat and Al-Niaimi, 2018).***

Striae distensae are a reflection of "breaks" in the connective tissue. Skin distention may lead to excessive mast cell degranulation with subsequent damage of collagen and elastin ***(Salter and Kimball, 2006).*** Prolonged use of oral or topical corticosteroids or Cushing syndrome (increased cortical activity) leads to the development of striae ***(Schoepe et al., 2006).***

Various therapeutic approaches like topical tretinoin, hydrant creams, different acid peels and microdermabrasion have been proposed for the improvement of striae distensae (***Park et al., 2012).***

Other modalities, such as pulsed light and 585 nm flash lamp-pumped pulsed-dye LASER (PDL) have also

been proposed with variable results ***(Al-Dhalimi and Abo Nasyria, 2013).***

Microneedling only, microneedling combined with topical vitamin C and fractional CO_2 LASER showed promising results in treatment of striae distensae alba ***(Naspolini et al., 2019), (Casabona and Marchese, 2017).***

Microneedling is being used in dermatology for mainly two purposes, firstly, collagen induction therapy for scars, stretch marks and antiaging effect and secondly, for deep transdermal delivery of active substances through epidermal barrier (stratum corneum) ***(Denet et al., 2004)***. The microchannel formation enhances penetration of product and stimulates collagen production for rejuvenation and treatment of acne scars and stretch marks ***(Aust et al., 2008)***.

Vitamin C, ascorbic acid factor, plays a dual role. It is a required cofactor for several hydroxylases and monooxidases. It is also the most significant scavenger of free radicals by allowing vitamin E to remain in its active form ***(Hinek et al., 2009).*** In the dermis, vitamin C is required for the formation of hydroxyprolyl residues to form stable triple-helical collagen molecules and hydroxylysyl residues operating in crosslinks synthesis ***(Humbert et al., 2010).***