Evaluation of the effect of Dermaroller combined with Jessner's peel on different types of atrophic post acne scars

Thesis

Submitted for partial fulfillment of
Master degree in Dermatology, Venereology and Andrology

by

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2014

Acknowledgement

First of all, thanks to *Allah* for guiding me in accomplishing this work and for everything else I have.

It's a pleasure to express my deepest thanks and respect to my honored *Prof. Dr. Nermeen Samy Abdel Fattah,* Associate Professor of Dermatology, Venereology and Andrology, Ain Shams University, for her continuous encouragement, valuable supervision and guidance which were of a great value to me throughout this work. It was indeed an honor to have been supervised by her.

Also, I would like to express my deep gratitude and sincere thanks to *Dr. Khaled M. Abd El-Raouf El-Zawahry,* Lecturer of Dermatology, Venereology and Andrology, Ain Shams University, for his kind support, help, and careful supervision, guidance, and advice.

Nourhan M. Ashraf

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P. acne	Propionibacterium acne	4
IL-1	Interleukin 1	5
EGF	Epidermal growth factors	5
PPAR	peroxisome proliferator-activated receptor	5
TNF	Tumor necrosis factor	6
TLRs	Toll-like receptors	7
PAMP	Pathogen-associated molecular pattern	7
MMPs	Matrix metalloproteinases	9
AP-1	Activator protein 1	21
PRP	Platelet rich plasma	24
TCA	Trichloroacetic acid	24
Nd-YAG	neodymium-doped yttrium aluminum garnet	27
MTZs	Microscopic treatment zones	28
IPL	Intensed pulsed light	28
RF	Radio frequency	29
CCC	Corrective cover cosmetic	30
PCI	Percutaneous collagen induction	32
CIT	Collagen induction therapy	32
PDGF	platelet-derived growth factor	33
FGF	fibroblast growth factor	33
TGF	Transforming growth factor	33
HSV	Herpes simplex virus	36
PIH	Post inflammatory hyperpigmentation	37
EMLA	Eutectic mixture of lidocaine and prilocaine	38
AHA	α -hydroxy acids	43
H&E	hematoxylin and eosin	58
NRS	Numerical rating scale	60
SPSS	Statistical Package for Scientific Studies	62
SD	Standard deviation	62
No	Number	62
ANOVA	Analysis of variance	62
CROSS	chemical reconstruction of skin scars	98

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Introduction

Introduction

Acne vulgaris is a common chronic inflammatory disease of the pilosebaceous unit. It is characterized by the formation of non-inflammatory comedones and inflammatory papules, pustules, nodules and cysts. Acne is extremely common and usually starts during the teenage years. The lesions usually involve the face, back and chest. Severe inflammation may lead to scarring after healing. Psychosocial impact of acne can be tremendous and lead to a poor quality of life. Proper understanding of pathogenesis of acne will lead to better management ***(Tahir, 2010).*** Acne scars may be atrophic or hypertrophic. The former type is usually classified as ice pick, boxcar, or rolling scars ***(Alam and Dover, 2006).***

Many therapeutic modalities have been developed to attempt cosmetic correction of acne scarring, including ablative laser resurfacing, chemical peeling, dermabrasion, punch techniques, subcuticular incision (subcision), injection of dermal fillers, and most recently fractional photothermolysis ***(Kucuktas et al., 2013).***

The problem of acne scarring cannot be solved by a single best treatment. Acne scars come in a wide variety of structures and depths, and each of the currently available treatments is ideally suited to address a subset of this spectrum ***(Pirigyi and Alam, 2010).*** With the advent of research and technology, the goal of attaining excellent results in improving acne scars may ultimately be achievable ***(Handog et al., 2010).***

Microneedling also known as collagen induction therapy is a simple procedure for the treatment of atrophic acne scars. Skin needling is a procedure that involves using a sterile roller comprised of a series of fine, sharp needles to puncture the skin.

Performed under local anesthetic with sedation, the device is "rolled" over the surface affected by acne scars to create many microscopic channels deep into the dermis of the skin, which is stimulated to produce new collagen ***(Fabbrocini and Pia De Padova, 2012).*** The mechanism behind clinical improvement of scars was purposed to be the result of tangentially cutting of fibrotic scars by pressure rolling and induction of blood clot, platelets activation, release of cytokines especially platelet-derived growth factor, transforming growth factor, etc. These result in induction of new collagen formation, scar remodeling, elevation of atrophic scar, and reduction of fibrotic scar borders. The degree of scar improvement from wound remodeling goes on for many months even after a single treatment ***(Polnikorn, 2009).***

It has been seen that a combination of various modalities gives better results than using a single method of treatment of atrophic post acne scars ***(Sharad, 2011).*** Superficial peelings can be more widely utilized in combination with other treatments of acne scars such as needling, lasers, and fillers ***(Ruiz-Esparza and Gomez, 2003).*** Further primary research such as randomized controlled trials is needed in order to quantify the benefits and to establish the duration of the effects, the cost-effective ratio of different treatments, and the evaluation of the psychological improvement and the quality of life of post acne scars patients ***(Fabbrocini et al., 2010a).***

Aim of the work

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The aim of this work is to evaluate the effect of dermaroller combined with Jessner's peel on different types of atrophic post acne scars.

Review of literature

Chapter 1

Post acne scars

Acne vulgaris

Acne vulgaris is a disease of the pilosebaceous unit characterized by the formation of open and closed comedones, papules, pustules, nodules and cysts. It is the most common disorder treated by dermatologists. It is a pleomorphic disorder and can manifest at any time during life but it most commonly presents between ages of 12-24 years. Multifactorial nature of acne has been elucidated lately. An improved understanding of the pathophysiology of acne leads to rational therapy for successful treatment ***(Tahir, 2010)***.

There are 4 primary pathogenic factors, which interact in complex manner to produce acne lesions:

(1) Increased sebum production by the sebaceous gland.
(2) Propionibacterium acne (P. acne) follicular colonization.
(3) Alteration in the keratinization process.
(4) Release of inflammatory mediators into the skin ***(Thiboutot et al., 2009)***.

Of these, altered follicular keratinization and increased sebum production are the most important, because they combine to induce the microcomedo, the primary lesion of acne. The microcomedo can evolve into either a non-inflammatory comedo or become inflamed and present as a papule, pustule or nodule ***(Gollnick et al., 2003)***.

Altered Follicular keratinization

The earliest morphological change in the sebaceous follicle is an abnormal follicular epithelial differentiation, which results in ductal hypercornification. Cornified cells in the upper section of the follicular canal become abnormally adherent. Comedones