

ACNE-TREATMENT AND PREVENTION OF ACNE-SCARS FORMATION WITH A NEW LDM®-TECHNOLOGY

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INTRODUCTION

Acne remains the most widespread dermatologic problem by teenagers and adults. App. 80% of the population aged between 11 and 30 is affected [1]. The pathophysiology of acne is not quite clear; it is believed that various factors are involved. Besides cosmetic skin cleaning, classical acne treatment includes the administration of salicylic acid, retinols, isotretinoin and some antibiotics. The remission time after such treatments is on average 3 months, whereas some side effects (such as skin irritations, chelitis, photosensibilisation, depressions, dry eyes, leukopenia, etc.) can occur. The administration of antibiotics is very usual; however there are more and more resistant *P.acnes* strains. It is well known that false anti-inflammatory therapy can cause the development of acne scars, which are the long lasting aesthetic problem. The treatment of acne scars can cause other severe side effects. Thus the development of the new acne treatment methods with a preventive strategy against acne scars formation is of great interest.

THEORETICAL BACKGROUND

The theoretical basis for such a new treatment strategy can be built by the recent cognitions that the matrix metalloproteinases (MMPs) are strongly involved in the pathophysiology of the acne formation [2]. MMPs are zinc-dependent enzymes which are involved in the physiological as well as in the pathological breakdown of the connective tissue. The collagen metabolism in acne skin is strongly modified; the activity of MMP-1 (collagenase-1), MMP-3 (stromelysin-1) and MMP-13 (collagenase-3) is for example respectively 500-, 1000- and 15-times higher than in normal skin [2]. Such a shift of equilibrium in the collagen tissue in the direction of its degradation can be a very important pathophysiological mechanism of acne scars formation. The new treatment strategy can thus be the specific temporal reduction of the MMP-concentration in the acne skin, which not only has to show the effect on the acne lesions but also to prevent the acne scar formation.

Some chemicals (retinoids, corticosteroids, tetracycline, etc.) as well as some physical methods [3,4] can modify the MMP-activity, whereas these methods can influence

different MMPs and have very different effect duration, which normally defines the treatment rate.

LDM®-TECHNOLOGY

In this pilot study we have tested the new patent pending LDM® (Local Dynamical Micro-massage)-Technology based on ultrasound waves with frequencies of 3 MHz and 10 MHz which alternate frequently (100 to 1000 times per second). The wave formation in the LDM®-wave is shown in Fig. 1. This frequency oscillation presents the unique possibility to produce a dynamic modulation of the ultrasound micro-massage effects.

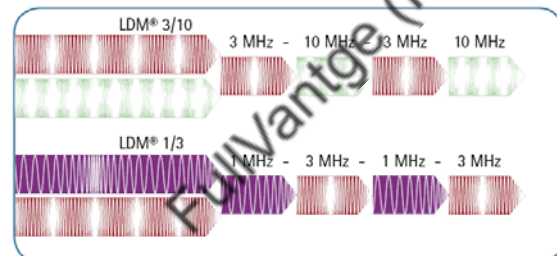


Fig. 1. Wave formation in LDM®-Technology.

Preliminary *in vitro* experiments have demonstrated that this method can significantly influence the production of MMPs and heat shock proteins (to be published elsewhere).

PILOT STUDY PROTOCOL

In this pilot study we have tested the LDM®-Technology based on the ultrasound waves with frequencies of 3 and 10 MHz. The commercially available machine LDM®-MED (Wellcomet, Germany) was used as LDM® wave generator. Ultrasound intensity was controlled by digital ultrasound power meter UPM-DT-10 (Ohmic Instruments Co., USA).

The treatments were performed 1-2 times per week; the total number of sessions was 12-16. 10 patients with different acne forms were treated. The local effect of LDM®-treatment was confirmed through face splitting. The treatments were pain free. No side effects (besides some transient erythema in some patients) were registered.