

## Changes to abdominal striae distensae (stretch marks): Biophysical measurements and histological examination by in vivo confocal microscopy following 8 weeks use of a cosmetic product

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### Introduction:

Striae distensae are commonly formed on the abdomen, thighs and some other body sites and the aetiological pathogenesis is multifactorial, including following pregnancy or as a result of significant changes in body mass, genetic predisposition, growth spurts in puberty or as an association with Marfan's or Cushings syndromes. They are twice as common in females, compared to males, and display as linear scars, initially with a significant erythematous appearance and often with itch (striae rubra or striae gravidarum), which fades to silvery grey over a period of several years (striae alba). Histologically, the change from striae rubra to alba involves distension and tearing of elastic fibres, initial inflammatory cell involvement and eventual thinning of the epidermis. Several treatments are available that claim to improve the appearance of striae including laser ablation, intense pulsed light and other minor surgical approaches. In addition, there are several cosmetic products available that similarly claim to improve the visible appearance of striae. It has been established that regular moisturisation is beneficial to help prevent and reduce the severity of stretch marks on the abdomen by increasing skin elasticity, and therefore reducing the likelihood of tearing. This study was designed to obtain objective evidence that regular use of two moisturising products: a *moisturising cream* and a *serum* were able to increase skin moisturisation and elasticity, when used alone or together. We will present results from a study to evaluate the biophysical changes in the skin of females with striae gravidarum that were less than 3 years since formation and whether regular use of a topical cosmetic product over 8 weeks could lead to changes in the biophysical measurements. A *Corneometer™*, *Cutometer™* and a *Chromameter™* were used to measure the biophysical changes. In addition, dermatoscopic images and in vivo confocal images were taken of selected striae using a *Canfield VisioMed D200™* and *Vivascope 150™* instrument respect. and volunteers completed self-evaluation questionnaires. The volunteers were given the products to apply to the abdomen twice daily for 8 weeks. The volunteers were asked to return to the clinic after 4 weeks and again after 8 weeks of use for repeat measurements. The dermatoscopic images and in vivo confocal images were taken only after 8 weeks. Data were compared statistically using ANOVA for multiple comparisons (Tukey-HSD method).

### Materials & Methods:

The study was a randomized, open study of two cosmetic products in twenty-five (25) female volunteers. The test site was the area of the abdomen where stretch marks are prevalent. Volunteers used a *moisturising cream* on the whole abdomen and a *moisturizing serum* on one side only, according to a pre prepared randomization schedule. The first applications were in the clinic under the supervision of clinic staff in order to assist with compliance and the correct use of the products. The products were used twice daily by the subjects at home for a period of eight weeks. Assessments were carried out at baseline before product use, two hours after first product use and after four weeks and eight weeks of use. The hydration of the skin surface was measured using a *Corneometer*. The elasticity of the skin was measured using a *Cutometer*. The skin colour was measured using a *chromameter*. Each of these assessments were carried out at each time point. Data will be analysed using ANOVA for multiple comparisons to determine if there is a statistically significant change. Standardised digital images were taken of the striae with a Canon DSLR under controlled lighting to be blind scored by trained study personnel. To determine the histological changes dermatoscopic images and in vivo confocal images were taken of selected striae using a *Canfield VisioMed D200™* and *Vivascope 150™* instrument respect. These images were taken at baseline and at week 8. The volunteers were given questionnaires at week 4 and 8 to self-evaluate the efficacy of the products.

### Results & Discussion:

Both the moisturising cream (A) and the moisturising cream and serum (AB) showed an increase in *Corneometer* readings indicating increased moisturisation during the course of the study. The mean values increased after a single application (Baseline plus two hours) to a similar level for both treatments, with further increases at Plus four weeks. The values at Plus eight weeks did not show any further increase relative to Plus four weeks. When analysed statistically no difference was noted between the moisturising cream (A) and the moisturising cream and serum (AB) at each time of assessment.



There was little change in the mean *Chromameter a\** values at Baseline plus two hours for both the moisturising cream (A) and the moisturising cream and serum (AB). At Plus four weeks a small decrease in *Chromameter a\** mean values was noted for both treatments indicating a slight decrease in redness. The values at Plus eight weeks were increased slightly for the moisturising cream (A) relative to the values at Plus four weeks whereas the values for the moisturising cream and serum (AB) were unchanged. The results of the statistical analysis indicated no statistically significant changes during the course of the study.

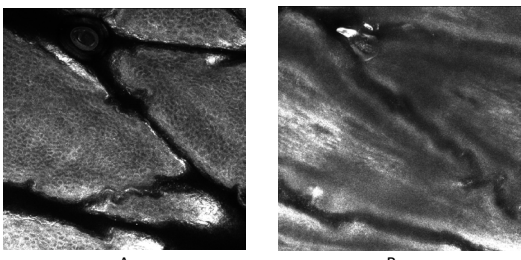


There was little change in the *Cutometer R5* and *R7* mean values during the course of the study for both the moisturising cream (A) and the moisturising cream and serum (AB). Overall, there was only a very small decrease in both the *R5* and *R7* values at Plus four weeks and Plus eight weeks.



### Conclusions:

It was determined that during the course of the study, that the moisturising cream (A) and the moisturising cream and serum (AB) had no significant change to the elasticity of the skin or the redness of the skin. The only significant changes to the *Striae distensae* were in the moisturisation. The moisturisation increased at both the baseline plus two hours and at plus four weeks time points and were the only changes that were statistically significant when analysed. This was reflected in the confocal imaging taken.



A

B

In vivo confocal images of a striae. Image A is mid-epidermis showing keratinocytes and typical architecture. Image B is the reticular dermis and shows torn collagen fibres at left, typical of striae.