

## Efficacy Evaluation of an Oil-in-Water Emulsion (Dermoflan) in Atopic Dermatitis

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Sir,

Atopic dermatitis (AD) is a chronic pruritic disorder clinically characterized by erythematous, often scaling, macules, patches, papules and plaques that become lichenified, excoriated and crusted. The prevalence of AD has substantially increased during past decades, and has resulted in a significant economic burden on the Health Service and on families of affected children (1). Diagnosis of AD is based on physical examination as well as family and patient history of allergic asthma, rhinitis and conjunctivitis (2). Although clinical manifestations vary with age, they may be present in any combination depending on a complex relationship among genetic, immunologic, pharmacologic and emotional factors.

A variety of topical therapies are currently available for treatment of AD (3, 4), although corticosteroids are likely one of the most used therapeutic approaches. A short-term treatment and the use of low potency steroids, particularly in children, are usually recommended because of their well-known side effects. Emollients can be employed as first-line treatment in mild AD either alone or as steroid-sparing agents, or as adjuncts to systemic therapy in severe AD (5–7). The main function of emollients is to improve the skin barrier function, thus preventing irritant or allergic dermatitis. The objective of our study was to examine the efficacy of an oil-in-water (O/W) emollient (Dermoflan<sup>®</sup>) in patients with AD, as assessed by evaluation of SCORAD index, hydration and pH of the skin.

### MATERIALS AND METHODS

Forty patients, 22 males and 18 females, aged 8 months to 14 years (mean  $7.5 \pm 4.1$  years), were randomly selected among patients with AD attending the Departments of Dermatology of the Universities of L'Aquila and Rome, Italy. Mild AD (SCORAD  $<15$ ) was diagnosed in 9/40 (22.5%) patients, moderate AD (SCORAD 15–40) in 28/40 (70%) patients and severe AD (SCORAD  $>40$ ) in 3/40 (7.5%) patients. The tested product (Dermoflan – Drex Pharma, Italy) is an O/W emulsion containing emollient, a lenient (or soothing) extract from *Olea Europea* and anti-oxidative components, including dipotassium glycyrrhizate, decarboxy carnosine HCl and ascorbil tetraisopalmitate; lipids constitute 27% of the cream. Treatments given prior to the study start included antihistamines, antibiotics, topical and/or systemic corticosteroids. All patients discontinued any topical and/or systemic therapy one month before treatment with the study product. Topical application of the emulsion on lesional areas and on uninvolved skin of the same patient was prescribed twice daily for 4 weeks. Patients were allowed to use neutral cleansing daily but no other skin care product. For each patient, clinical evaluation was assessed calculating the SCORAD index before treatment and during treatment at weeks 2 and 4. Paired comparison of hydration and pH of treated and control areas (forehead or trunk) were recorded at the first visit, after 2 weeks of treatment, and after 4 weeks of treatment

using the corneometer SM CM PH Combi 3 (G.F. Secchi, Italy). Levels of hydration of the stratum corneum are:  $<50$  for very dry skin, 50–60 for dry skin and  $>60$  for normally hydrated skin, whereas pH can vary from acid (3.5–4.4) to normal (4.5–5.5) or alkaline ( $>5.7$ ).

To evaluate the treatment efficacy, SCORAD index, hydration and pH were analyzed by ANOVA repeated measures analysis of variance. Time effect (i.e. variance of mean values over time), group effect (i.e. variance of mean values between groups) and time  $\times$  group effect (i.e. variance of mean values considering both time effect and group effect) were calculated by ANOVA. Statistical analysis was performed using SAS/STAT software (SAS Institute, Cary, NC, USA). We considered a significant  $p$  value  $<0.05$  (8).

### RESULTS

Lower values of hydration and higher values of pH were found at the first visit in lesional skin at different body sites (e.g. flexural areas) as compared to uninvolved skin of AD patients.

Complete regression of cutaneous lesions was observed in all 9 patients with mild AD (Fig. 1) and in 11 of 28 (39.3%) patients with moderate AD, within 4 weeks of topical treatment with the O/W emulsion (Dermoflan). Improvement from moderate into mild AD was detected in 16 of 28 (57.1%) patients, whereas 1 of 28 patients with moderate AD showed no response. Of the 3 patients with severe AD, clinical improvement to moderate AD was observed in 2, while the other showed no response. A significant decrease ( $p < 0.0001$ ) of SCORAD index was detected from baseline evaluation (mean  $25.35 \pm 11.31$ ) to week 2 (mean  $18.92 \pm 11.57$ ) and week 4 (mean  $11.57 \pm 9.606$ ). A significant increase of hydration values and decrease of pH values, as assessed during treatment at weeks 2 and 4, were obtained in lesional skin as well as in uninvolved skin (Table I).

### DISCUSSION

Several studies have reported increased transepidermal water loss (TEWL) and reduced hydration values in eczematous skin compared to uninvolved skin of AD patients (9–11). In 1995, Seidenari & Giusti (12) performed a case-control study and found significantly higher values of TEWL at the eczematous and uninvolved skin sites of AD patients compared to the healthy skin of a control group. In addition, hydration of the stratum corneum of dry skin in AD patients was significantly lower than in the clinically uninvolved skin of AD, and pH values showed a shift towards alkalinity in both eczematous and uninvolved skin (12). In our study, lesional skin showed lower values of hydration and higher values of pH compared to the uninvolved skin of AD patients.

In mild and moderate AD, moisturizing and emollient creams are known to be effective through

Table I. Repeated measures analysis of variance of hydration and pH values of lesional and uninvolved skin

	Skin	Baseline (mean $\pm$ SD)	Week 2 (mean $\pm$ SD)	Week 4 (mean $\pm$ SD)	Statistics		
					F <sub>time effect</sub>	F <sub>group effect</sub>	F <sub>time <math>\times</math> group effect</sub>
Corneometry (a.u.)	Uninvolved skin	53.9 $\pm$ 12.8	56.2 $\pm$ 9.2	59.9 $\pm$ 7.9	26.9	4.47	51.2
	Lesional skin	36.6 $\pm$ 10.1	45.1 $\pm$ 11.0	50.5 $\pm$ 8.6	$p=0.0001$	$p=0.006$	$p=0.0001$
pH	Uninvolved skin	5.0 $\pm$ 0.6	5.1 $\pm$ 0.6	5.1 $\pm$ 0.5	10.79	16.73	6.35
	Lesional skin	5.7 $\pm$ 0.6	5.6 $\pm$ 0.5	5.2 $\pm$ 0.9	$p=0.0001$	$p=0.0001$	$p=0.0007$

an increase of skin hydration and improvement of barrier function (7, 13–15). Tabata et al. (14) indeed demonstrated that repeated daily applications of moisturizers, without any pharmacologically active agent, can induce long-lasting hydration effects in AD patients. In addition, Lodén et al. (15) showed that a urea-containing moisturizer improved the water barrier function and significantly reduced the skin susceptibility to irritants (i.e. sodium lauryl sulphate), as measured by TEWL and superficial skin blood flow. Our study showed that twice-daily applications for 4 weeks of an O/W emulsion (Dermoflan) induced a complete remission in all patients with mild AD and in 39.3% with moderate AD. Interestingly, topical application of the emulsion alone allowed improvement from moderate to mild AD in 57.1% of patients and from severe to moderate in 2 of 3 patients. A significant increase of skin hydration and decrease of skin pH was observed in both lesional and uninvolved skin. Results of multivariate analysis over

time, within-subject and between-subject effects were significant, indicating that mean values of pH and hydration change significantly over time (time trend effect) and skin condition (group effect). Thus, clinical improvement was assessed although differences between groups remained constant over time.

In conclusion, Dermoflan is effective for treatment of mild AD and might be an adjunctive therapy to topical corticosteroids in moderate and severe AD allowing reduction of dose and time of the steroid regimen.

#### REFERENCES

- Emerson RM, Williams HC, Allen BR. What is the cost of atopic dermatitis in preschool children? *Br J Dermatol* 2001; 143: 514–522.
- Hanifin JM, Rajka G. Diagnostic features of atopic dermatitis. *Acta Derm Venereol* 1980; Suppl 92: 44–47.
- Eedy DJ. What's new in atopic dermatitis? *Br J Dermatol* 2001; 145: 380–384.
- Tofte SJ, Hanifin JM. Current management and therapy of atopic dermatitis. *J Am Acad Dermatol* 2001; 44: S13–S16.
- Marks R. How to measure the effects of emollients. *J Dermatol Treat* 1997; 8: S15–18.
- Lucky AW, Leach AD, Laskarzewski P, Wenck H. Use of an emollient as a steroid-sparing agent in the treatment of mild to moderate atopic dermatitis in children. *Pediatr Dermatol* 1997; 14: 321–324.
- Grassi A, Palermi G, Paradisi M. Study of tolerance and efficacy of cosmetic preparations with lenitive action in atopic dermatitis in children. *Clin Ter* 2000; 151: 77–80.
- SAS/STAT User's Guide Version 6, 4th ed. SAS Institute, Cary, NC, 1989.
- Shahidullah M, Raffle EJ, Rimmer AR, Frain-Bell W. Transepidermal water loss in patients with dermatitis. *Br J Dermatol* 1969; 81: 722–730.
- Abe T, Ohkido M, Yamamoto K. Studies on skin surface barrier functions: skin surface lipids and transepidermal water loss in atopic skin during childhood. *J Dermatol* 1978; 5: 223–229.
- Blichmann C, Serup J. Hydration studies on scaly hand eczema. *Contact Dermatitis* 1987; 16: 155–159.
- Seidenari S, Giusti G. Objective assessment of the skin of children affected by atopic dermatitis: a study of pH, capacitance and TEWL in eczematous and clinically uninvolved skin. *Acta Derm Venereol* 1995; 75: 429–433.
- Lodén M. The increase in skin hydration after application of emollients with different amounts of lipids. *Acta Derm Venereol* 1992; 72: 327–330.
- Tabata N, O'Goshi K, Zhen YX, Kligman AM, Tagami H. Biophysical assessment of persistent effects of moisturizers after their daily applications: evaluation of corneotherapy. *Dermatology* 2000; 200: 308–313.
- Lodén M, Andersson A-C, Lindberg M. Improvement in skin barrier function in patients with atopic dermatitis after treatment with a moisturizing cream (Canoderm®). *Br J Dermatol* 1999; 140: 264–267.



Fig. 1. Atopic dermatitis of the face before (a) and after (b) 4 weeks' application of O/W emulsion.