is that the association signal we detected was due to the presence of regulatory rather than coding SNPs, as indeed is the case for many autoimmune diseases.[7] The data generated by the HapMap Consortium are consistent with this hypothesis, as they show that variants identified in our previous association study are in strong linkage disequilibrium with several SNPs mapping to the *DSG3* promoter. The notion that alleles affecting *DSG3* regulation may be pathogenic is also in agreement with results obtained in animal models, demonstrating that altered *DSG3* expression can affect epidermal differentiation[8] and keratinocyte cohesion.[9] In this context, a functional and genetic characterization of *DSG3* regulatory elements is now required and holds the promise to identify novel sequence variants affecting gene expression and disease susceptibility.

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Key words: *autoimmune disease, desmoglein 3, genetic susceptibility, pemphigus vulgaris*

Conflicts of interest: none declared.

Targeted broadband ultraviolet B phototherapy improves disorders characterized by increased dermal matrix

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Sir, Granuloma annulare (GA), dermatofibroma (DF) and keloid/hypertrophic scars (SC) are disorders with altered dermal matrix deposition for which there are currently limited treatment options. Ultraviolet (UV) irradiation promotes degradation of structural components of the dermis with induction of matrix metalloproteinases (MMPs) in normal human skin and inhibition of collagen production.[1,2] These findings led to studies using long-wave UVA (340–400 nm; UVA1) and psoralen plus UVA (PUVA) phototherapy to improve the appearance of GA and SC.[3,4] These treatments are traditionally delivered using a whole body unit where both normal and affected skin is exposed to UV irradiation. Targeted delivery of UV therapy to lesional skin minimizes exposure of normal skin to UV radiation and unnecessary risks such as burns or skin cancer.[5] Targeted UVB (tUVB) allows high-energy fluences delivered only to lesional skin and has shown promise in treating a range of skin diseases such as psoriasis and vitiligo.[6,7] Based on previous studies, we investigated the efficacy and advantages of a tUVB system in treating conditions with increased dermal matrix.

Fifteen patients with GA (n = 5), DF (n = 4) and SC (n = 6) were enrolled in the study. The mean age in the groups was 62, 35 and 44 years with a mean duration of disease of 2, 8 and 18 years, respectively. The predominant skin phototype was III (range II–VI). Patients with a prior history of photosensitivity, active or recent systemic or topical therapy, or pregnancy/lactation were excluded. UVB phototherapy was administered by the T500× Targeted Phototherapy System (Daavlin, Bryan, OH, U.S.A.), also called DuaLight (TheraLight Inc., Carlsbad, CA, U.S.A.), with an emission spectrum of 290–330 nm and peaks of 302 and 312 nm.[7] Localized irradiation was directed at study sites through a hand-held fibre optic cable with a square aperture of 3·63 cm^2. For patients with GA, similar lesional areas of skin were left untreated and monitored as control lesions throughout the study. Treatments were given up to three times per week for 16 weeks. Phototherapy was initiated with twice the minimal erythema dose (MED)[1] and was increased by 1 MED as tolerated. Clinical response was graded on a five-point scale (−1 = worsening, 0 = no change, 1 = improved, 2 = much improved,

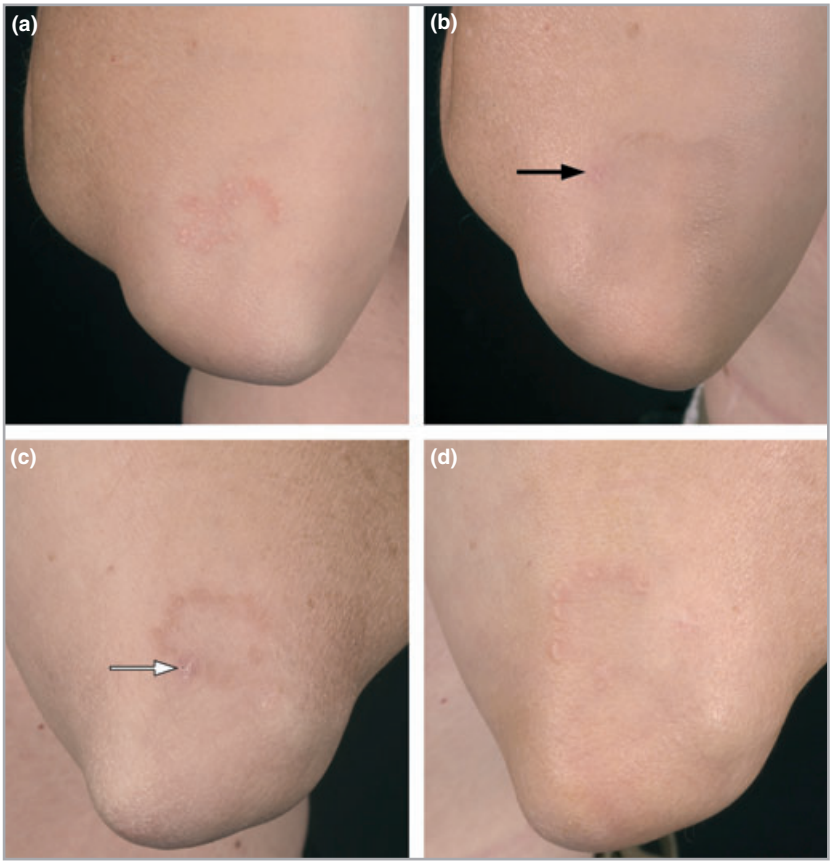

Fig 1. Granuloma annulare lesions of the elbows. Note in the right elbow the discrete papules seen pre-treatment (a) are no longer visible post-treatment and this response was maintained at week 29 (b), with mild tanning. The left elbow (c) served as a control and papules persisted at week 29 (d). A pre-treatment biopsy (white arrow) was taken from the control side to avoid confounding any potential benefits on the treated side, while a post-treatment biopsy (black arrow) was taken from the treated area at the end of the study.

3 = clear). The hardness of lesional skin was measured by a hand-held digital durometer (scale 00, model DD-3; Rex Durometers, Buffalo Grove, IL, U.S.A.) as previously described.[8]

Overall, patients tolerated treatments well. There was significant softening of lesions at the end of treatment compared with baseline, with an average reduction in durometer readings of 11% (range 0·5–34%, $P = 0·003$) whereas adjacent normal skin had an increase of 2·6% ($P = 0·002$). Good or excellent response (clinical grade 2 or 3) was observed in four patients (three GA, one DF), while nine patients (two GA, five SC, two DF) had a mild grade 1 response, and two patients (one SC, one DF) were nonresponders. Among the responders ($n = 13$), those who received tUVB three times weekly had better clinical outcome than those treated less frequently (mean durometer reduction 14% vs. 7%, $P = 0·25$; mean global response 1·7 vs. 1·0, $P = 0·0004$). The mean cumulative treatment dose was 46 J cm^{-2} (range 8–61) in the group treated three times weekly, and 20 J cm^{-2} (range 13–25) in the group treated less frequently.

Patients with GA had the greatest clinical response (Fig. 1) and we chose to study this group further. Tissue was obtained by 3-mm punch biopsies. Immunohistochemistry demonstrated the presence of CD3+ T cells, markers of histiocytes (CD68+), type I procollagen (SP1, PC1) and cell proliferation (Ki67 antigen) in untreated lesions and these markers were no longer detected post-treatment (Fig. 2). We observed a reduction in the expression of type I procollagen ($P < 0·05$) and in collagen III synthesis ($P = 0·12$) after tUVB treatment, as assessed by quantitative reverse transcriptase-polymerase chain reaction. No significant changes were observed in the expression of MMP1, MMP3 and MMP9.

Our pilot study demonstrates that tUVB phototherapy may improve the clinical appearance of disorders characterized by increased dermal matrix such as GA, DF and SC. Few studies have addressed the possible therapeutic efficacy of UVB on these conditions. The clinical effects of tUVB appear to be similar to those produced by UVA1 phototherapy, and alterations in collagen synthesis may be involved as demonstrated by immunohistochemistry in our patients with GA. Additionally, the greater clinical improvement we observed in these patients compared with the DF and SC subgroups, may partly be due to UV-induced immunosuppression acting along with its known antifibrotic response. Previous works demonstrated increased number of CD3+ and CD4+ T lymphocytes in GA lesions[9] and in our study, these cells were undetectable in lesional skin after UVB treatment.

Targeted phototherapy allows for rapid (< 30 s) delivery of controlled doses of irradiation to selected skin without exposing adjacent healthy tissues to unnecessary risks. With additional clinical experience and treatment optimization, tUVB may become an effective and safe therapeutic modality for GA, DF and SC, conditions in which there are currently limited management options.

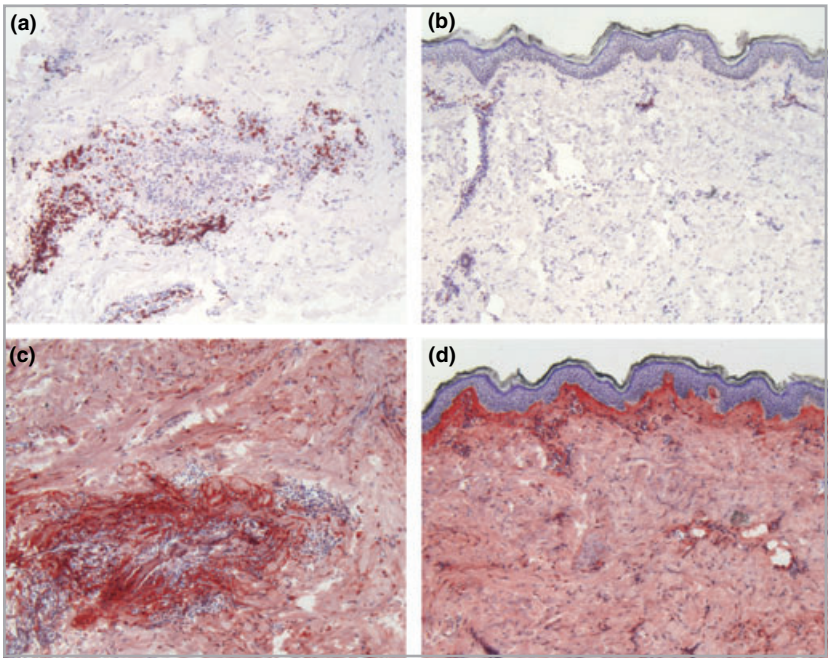

Fig 2. Immunohistochemistry. CD3+ T lymphocytes were present in the periphery of granuloma annulare (GA) lesions before treatment (a) and were undetectable after 16 weeks of treatment (b). Procollagen (PC1) was present in the periphery of GA lesions before treatment (c) and was undetected after 16 weeks of treatment (d). A biopsy was not obtained from one patient with GA who had significant vascular comorbidities and with lesions located on the lower limbs. Biopsies were not obtained from patients in the dermatofibroma (DF) and keloid/hypertrophic scar (SC) groups given the small lesional size of the DF and the risk of worsening the SC.

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Key words: *granuloma annulare, keloid scars, targeted phototherapy*

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A comparative study of the effects of disposable and Volkmann spoon curettes in the treatment of basal cell carcinoma

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Sir, Basal cell carcinoma (BCC) is the most common skin tumour.[1] Curettage has been widely used for treatment of BCC, especially at low-risk sites in elderly patients. We have therefore compared modern disposable curettes (Stiefel, High Wycombe, U.K.) with traditional Volkmann spoons. Ethical approval for the study was obtained.

Over a 5-year period 405 BCCs in 366 patients were computer randomized by tumour to treatment with disposable vs. nondisposable curettes in a comparative prospective study. Of the BCCs, 93% were primary tumours, 68% were < 1 cm in diameter, 60% were superficial spreading BCCs, 37% were nodular, and 71% were on the head and neck. Sixteen patients had 39 tumours (randomized individually) and appear in either or both groups. All tumours were small and well defined with no morphoeic appearance clinically. Age, sex, skin type, tumour size, site, type, and whether primary or