

LETTERS TO THE EDITOR

Strip patch test vs. conventional patch test to detect type IV sensitization in patients with allergic contact dermatitis

Editor

Spier and Natzel¹ first mentioned the strip patch test (SPT) as a modification of the patch test (PT) in their works about chromate allergy. The fundamental idea of the SPT was to obtain more reliable and sensitive patch test results by increasing the bioavailability of test substances in the deeper epidermal cell layers. This was achieved by stripping the test site several times with an adhesive tape prior to the application of the test substances. To date, the SPT is used in diagnostic routine (e.g. for testing substances with a poor percutaneous penetration or for clarifying a contact allergy in case of a negative PT). However, in contrast to the PT, no standardized recommendation for the SPT exists.

Thus, we read the article by Fernandes *et al.*² where they evaluated their suggested SPT procedure vs. conventional PT, with great interest. They used a 10-cm-wide Micropore® tape and performed two sequential tape strips prior to patch testing, quite similar to our recent proposal for carrying out a standardized SPT.³ They chose not more than two tape strips with the intention to remove only the superficial layer of the stratum corneum (SC), thereby avoiding provoking an irritant skin reaction.

In our opinion, the study by Fernandes *et al.*² needs clarification on two aspects. First, the elicitation of an allergic patch test reaction depends not only on the penetration of the allergen through the epidermal barrier. Additionally, according to today's knowledge of the mechanisms of allergic contact dermatitis (ACD), elicitation of ACD requires some type of irritative, non-antigen-specific proinflammatory stimulus preceding antigen-specific effector cell activation.^{4,5} Both of these factors seem to be essential, too, for eliciting a positive patch test reaction. Therefore, the postulated increase of sensitivity of SPT vs. PT is not solely a result of enhanced percutaneous penetration due to mechanical removal of the upper layers of the SC, but also to subclinical inflammation of tape-stripped skin induced by expression of non-antigen-specific proinflammatory cytokines (e.g. interleukin-1 β).^{6,7} Additionally, it was found that Langerhans' cells in tape-stripped skin showed increased epidermal cell density and stimulatory activity in terms of maturation, respectively.^{6,8}

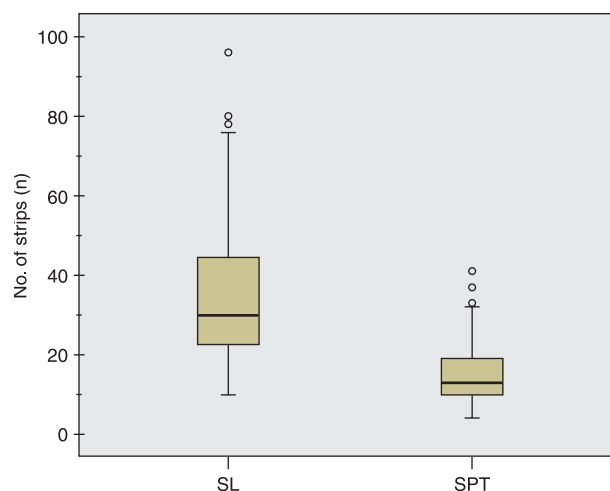


fig. 1 Sample's ($N=220$) number of strips until appearance of the SL (median, min, max: 30, 10, 96) and number of strips for the SPT (median, min, max: 13, 4, 41) calculated by multiplying by the tape-specific correction factor 11/26.

Although the exact number of tape strips has not been defined yet, none of the described proinflammatory skin reactions might happen in patients who undergo only limited tape stripping without serious barrier perturbation.⁷ Thus, the approach Fernandes *et al.*² chose, will produce only a reduced diagnostic benefit from the SPT.

Second, the central question remains how many times the test site should be tape-stripped to best present the allergen for elicitation of an eczematous reaction in a sensitized patient. In this context, we recently presented our reproducible easy-to-handle first approach for carrying out a standardized SPT.³ In developing a quantitative parameter of acute epidermal barrier disruption, we noticed that a 2-fold increase in transepidermal water loss indicated a critical SC strip depth,⁹ which can be recommended for SPT. Appearance of the stratum lucidum (SL; simple-to-judge visual reference indicating an almost complete removal of the SC) required a median number of 26 tape strips, with a broad interindividual variation of 10 to 50 tape strips. To calculate the number of tape strips necessary to achieve a 2-fold transepidermal water loss increase, the individual number of tape strips necessary before the SL appears, had to be multiplied by a tape-specific correction factor, which was 11/26 in our case. This means, that the 'median' patient needed 11 tape

strips prior to patch testing in SPT, and the variation ranged from 4 to 21. Fernandes *et al.*² used a different tape, so they may have a different tape-specific correction factor amongst others. However, it seems likely that just two strips will meet the requirements for an optimum SPT in very extreme cases only, and it will surely not be enough for the average patient. In an ongoing validation study, we find a confirmation of our previous results after having included the first 220 patients (fig. 1). We conclude that a fixed, patient-independent defined number of tape strips for the SPT might not be appropriate. This number should rather be determined depending on patient's skin and ambient conditions, as well as technical equipment.¹⁰

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