

Patch Testing: The Whole in Addition to the Sum of Its Parts Is Greatest

To the Editor:

We write to detail a pearl we found effective in our tertiary care patch-test clinic.

"The whole is greater than the sum of its parts" is a common phrase used to describe the synergistic action of two or more substances whose combined effect is much greater than the sum of their individual effects. Based on our findings, we suggest that the sum of the parts in addition to the whole is the greatest to detect allergic sensitivities in patients who present for patch testing. We recommend this approach because the combined effect of cross-reactors and constituents applied simultaneously with the allergen in question may aid in overcoming the threshold necessary to evoke a positive allergic response.

Five patients presented to the contact dermatitis clinic for evaluation, two with chronic eyelid dermatitis and three with chronic lip dermatitis. All were patch-tested with the North American Contact Dermatitis Group's 2004 standard evaluation series. Macular erythema was noted to balsam of Peru (BOP) in one eyelid dermatitis patient and one lip dermatitis patient. All other 64 allergens (including fragrance mix I and lanolin) demonstrated no reactions. In all five patients, the primary dermatitis worsened during the patch test. Within 2 weeks, all five patients were retested on their arms to BOP and the "BOP series" (Table 1) in addition to lanolin and Amerchol (Chemotechnique Diagnostics AB, Vellinge, Sweden). Notably, two eyelid dermatitis patients and one lip dermatitis patient reacted to BOP in addition to individual BOP constituents on retesting (Table 2). Also, flare-up reactions (in the patients who had originally developed macular erythema to BOP) were noted. Furthermore, the other two lip dermatitis patients had positive reactions to the lanolin and the Amerchol when tested together, even though they had been negative to

Table 1. Balsam of Peru Series

Allergen	2008 Series Locations
1. Cinnamic alcohol 2% pet	NACDS 33, fragrance, bakery
2. Amylcinnamaldehyde 2% pet	Fragrance
3. Eugenol 2% pet	Fragrance, stomatitis
4. Isoeugenol 2% pet	Fragrance
5. Benzyl alcohol 1% pet	NACDS 43, vehicles, fragrance
6. Vanillin 10% pet	Fragrance, stomatitis
7. Sodium benzoate 5% pet	Bakery
8. Hydroxycitronellal 2% pet	Fragrance
9. Cinnamic aldehyde 1% pet	NACDS 28, bakery
10. Benzoic acid 2% pet	Bakery
11. Geraniol 2% pet	Fragrance
12. Propolis 10% pet	NACDS 53
13. Colophony 20% pet	NACDS 3
14. <i>Myroxylon pereirae</i> (BOP)	NACDS 19

BOP = balsam of Peru; NACDS = North American Contact Dermatitis Standard; pet = petrolatum.

lanolin on the previous patch test. Importantly, all five patients clinically improved with avoidance of their identified allergens.

Positive test results to BOP have been highly associated with fragrance mix I, and both contain cinnamic aldehyde and cinnamic alcohol.¹ Benzyl alcohol is also a naturally occurring constituent of BOP.² Of interest, studies have shown that certain patients may react positively only to fragrance mix but to none of its constituents or vice versa, in which case they react to one of the constituents but not to the combined fragrance mix.³ We propose that the concurrent application of all of these known allergens helps to identify a BOP and lanolin allergy, possibly by overcoming a certain threshold level that is necessary to evoke a positive reaction although the exact mechanism has yet to be elucidated. Two published studies similarly found a significant increase in the detection of lanolin contact allergy when their standard series also included Amerchol.^{4,5}

By using this approach in five of our patients, we were able to increase the detection rates of lanolin and BOP. Adding cross-reactors and constituents to the patch-test panel may decrease false negatives and increase the detection of true positive patch-test reactions. We suggest testing Amerchol and lanolin together, and we also suggest patch-testing with BOP and the "BOP series" when these allergens

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Table 2. Allergen Reactivity

<i>Patient</i>	<i>Involvement</i>	<i>Allergen (RXN)</i>	<i>Retest Allergens (RXN)</i>
1	Eyelid	BOP (ME)	BOP, CAld, CA, BA (primary BOP site flare-up)
2	Eyelid	—	BOP, BA
3	Lip	BOP (ME)	BOP, CAld, CA, BA, SB, (primary BOP site flare-up)
4	Lip	—	Lanolin, Amerchol
5	Lip	—	Lanolin, Amerchol

BA = benzyl alcohol; BOP = balsam of Peru; CA = cinnamic alcohol; CAld = cinnamic aldehyde; ME = macular erythema; RXN = reaction; SB = sodium benzoate.

are suspected, because the sum of these allergens may meet a common threshold to provoke a positive response.

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