



Pro/Con Debate

CON: Skin testing with fresh foods



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The evaluation of a patient with suspected food allergy includes a detailed history, physical examination, and the detection of specific immunoglobulin E (IgE) antibodies to the relevant food allergen. Traditionally, identification of IgE antibodies against a specific allergen is performed with the use of Immunocap or by a skin prick test (SPT) with a commercially prepared allergen extract. Food allergen extracts contain major and minor allergens for the tested food and are widely used for the diagnosis of IgE-mediated food allergy. They are quick, easy to perform, and directly available in the allergy clinic, and results are given to the patient on the same day. Skin prick testing with natural foods is sometimes proposed as an alternative, but this is not a widely accepted practice. A possible exception may be made for patients with oral allergy syndrome, when commercial extracts appear less sensitive as a result of the allergens being altered during the process of fabricating the extract.¹ The prick-to-prick technique consists of pricking the fresh food directly with a lancet and then using the same lancet immediately for the skin prick.

An area of concern when using fresh food instead of commercial extracts relates to safety. Skin testing is generally considered a safe procedure with a large survey of more than 18,000 patients showing no adverse reactions to commercial food extracts²; fresh SPTs, however, have been associated with severe allergic reactions. Multiple cases are described in the literature, which involve hypersensitivity reactions to fresh food SPT, including severe anaphylaxis (Table 1). Specifically, Pitsios et al³ report 2 cases of anaphylaxis after skin testing with raw and cooked fish and with raw and cooked mammalian meat. In a different report, 4 patients are reported to suffer grade 4 (2 patients), grade 3 and grade 2 anaphylaxis after prick-to-prick testing with fresh fruit of the

Rosaceae (such as apple, pear, apricot, peach, plum, cherry), Anacardiaceae (such as mango, yellow mombin), and Caricaceae (such as papaya) families. Anaphylaxis has also been reported as a result of prick-to-prick testing with fresh avocado, cantaloupe, watermelon, and carrot as well as peanut, lupin, and pine nut (Table 1).

Another area of concern relates to the reliability and reproducibility of fresh food SPT. Fresh food SPTs contain both acidic and irritant properties. Food protein-induced contact dermatitis has been described in the literature and is often seen on the hands of food handlers.^{4,5} For example, fish juice contains high-molecular-weight polypeptides known to cause skin irritation.⁵ In fact, food protein causing contact urticaria is a special situation in which prick-to-prick testing with food proteins may be the preferred diagnostic method. When using fresh foods, no standard concentration of the food allergen can be ensured, and there is likely more test-to-test variability compared with commercial extract. No reliable way exists of telling that a positive result indicates presence of IgE or that a negative result rules out its detection. Dreborg and Foucard⁶ have stressed the risk of false-positive reactions after identifying a large number of children with positive fresh SPT for apple, potato, and carrot who had no history of ever reacting to these foods.⁶ Additionally, there are no established cutoffs for diagnosis of food allergy for fresh food SPT compared with commercial extracts.

Limited data involve direct comparison of fresh with commercial SPTs. Cantani et al⁷ evaluated 58 children between 9 months and 12 years of age, with atopic dermatitis and food allergies, and compared performance of fresh vs commercial skin testing. Oral food challenges confirmed more than 96% of the food allergy diagnoses made by commercial extract SPT, but only 90% of diagnosis made by prick-to-prick testing with fresh food.⁷ Ortolani et al⁸ have reported on 100 adult patients with a history of oral allergy syndrome after testing with both fresh foods and extracts, with the aim to assess the reliability of these tests. The authors concluded that although sensitivity was better with fresh SPT for a few selected vegetables and fruit (carrot, celery, cherry, apple, tomato,

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Table 1
Reported Cases of Anaphylaxis to Fresh Food Skin Prick Testing

Author, year	Number of cases	Fresh foods used for skin testing	Reported symptoms or reported grade of anaphylaxis
Scheur et al, 2004	1	Pine nut	Local skin reactions, dyspnea, angioedema, circulatory collapse
Pitsios et al, 2009	2	Case 1: Raw and cooked fish. (mackerel, bogue, salmon, anchovy, bassfish, brown picarel, comber, streaked gurnard, pandora) Case 2: Raw and cooked meat (beef, pork, lamb, rabbit)	Pruritus, generalized urticaria, tachycardia Facial pruritus and erythema, urticaria, rhinitis, conjunctivitis
Ciccarelli et al, 2014	1	Roasted peanut & boiled lupine	Angioedema, pruritus, urticaria, cough, dyspnea, bronchoconstriction, conjunctival erythema
Galindo-Pacheco LV et al, 2014	4	Fresh fruit of the Rosaceae, Anacardiaceae and Caricaceae families	Grade 2 (1 patient), grade 3 (1 patient), grade 4 (2 patients).
Hernández-Moreno KE, 2017	1	Avocado, cantaloupe, carrot, watermelon	Dyspnea, pruritus, erythema, dizziness, sibilance.

and orange), this was certainly not the case for nuts, where commercial extract SPTs performed much better.⁸

Many practical limitations prevent the use of fresh food SPTs, such as access to fresh food at the allergy clinic, maintaining foods fresh for adequate periods of time, and the culprit fruit not being available in its fresh form depending on the harvest season. Patients can be asked to return for a second appointment, bringing their own fresh food, but this practice may delay the diagnosis and can be time consuming. When using fresh foods, there is also concern that the incorrect portion of the food may be used for prick-to-prick testing. For example, the reaction may be to the peel, or seed (eg, peach or citrus fruits), rather than the pulp of the fruit itself. In a Spanish study of peach allergy in children, 80% had positive prick tests with peach peel, but only 35% had positive results with peach pulp.⁹

In summary, fresh food skin prick testing is not currently a widely used practice (with the exception of oral allergy syndrome). This is mostly because of safety concerns and reports of anaphylaxis, as well as poor reliability and reproducibility of testing. Limited availability in clinic, and the potential of food protein-induced contact dermatitis are additional limitations. Finally, it is important to remember that skin prick tests are only 1 piece of the puzzle in food allergy diagnosis. Detection of sensitization is an

incomplete exercise, and the gold standard test of a food provocation challenge should be used for confirmation of equivocal cases.

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