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Using Transepidermal Water Loss to Guide Oral Food Challenges

Ryan Quigley:
You're listening to *AudioAbstracts* on ReachMD. I'm Ryan Quigley, and today, I'll be discussing a randomized clinical trial that examined whether transepidermal water loss, or TEWL for short, can help reduce the severity of allergic reactions in young children during peanut oral food challenges.

But before we dive into this study, let's cover some key background. Food allergies affect nearly eight percent of children, and peanut allergy is a leading cause of food-induced anaphylaxis. And although oral food challenges remain the diagnostic gold standard, their use is often limited by safety concerns. This has driven interest in objective, real-time tools that could help clinicians make safer decisions during challenges.

Now, TEWL is a noninvasive measure of skin barrier integrity. Prior observational studies have shown that TEWL can rise during allergic reactions, sometimes even *before* reactions fully evolve.

Which brings us to the research we'll be focusing on today. In this single-center trial, investigators enrolled forty children between six months and five years of age with confirmed peanut allergy. All participants underwent a supervised peanut oral food challenge.

During this challenge, children were randomized to standard stopping criteria or to an intervention strategy in which the challenge was stopped either for standard dose-limiting symptoms *or* when a rise in TEWL of at least one gram per square meter per hour occurred in addition to a single objective allergic symptom. So, this TEWL-based rule supplemented—rather than replaced—existing clinical stopping criteria.

And based on this design, the primary outcome was the rate of anaphylaxis among children who reacted during the challenge, which was assessed using several established definitions.

So with all that in mind, let's turn to the results. Among reactors, children in the TEWL-guided group experienced significantly lower rates of anaphylaxis. Using criteria from the Consortium for Food Allergy Research, anaphylaxis occurred in 63 percent of reactors in the intervention group compared with 100 percent in the control group. And based on the World Allergy Organization criteria, anaphylaxis rates were 13 percent versus 57 percent. And no significant differences were observed when Brighton or FAAN definitions were applied.

Reaction severity also differed between groups. After applying criteria from both the Consortium for Food Allergy Research and World Allergy Organization, median severity scores were lower in the TEWL-guided group, indicating fewer organ systems involved or less severe symptoms. As a result, fewer children in the intervention group required epinephrine, although it's important to note that this difference did *not* reach statistical significance.

Additionally, researchers found that the timing of symptom onset, first treatment, and epinephrine administration did not differ between groups. This suggests that the observed reduction in severity was not due to earlier recognition or faster treatment of anaphylaxis. Instead, the benefit appears to be related to earlier stopping of allergen dosing, which prevented the progression of reactions by avoiding additional peanut exposure once early physiologic changes were detected.

A final key finding was that TEWL increases were frequently observed early in the challenge process, often within the first few doses. This supports its potential role as an early physiologic signal rather than a late marker of severe reaction, especially when compared with vital sign changes, which often lag behind clinical deterioration.

Now, with these results in mind, there are some important limitations to consider, primarily that this was a small, single-center pilot study

limited to young children and peanut allergy. And so larger, multicenter studies are needed to validate these findings, refine monitoring windows, and determine how TEWL might be integrated into routine clinical practice.

But even with these limitations, this trial suggests that real-time TEWL monitoring may help clinicians decide when to stop an oral food challenge earlier, reducing reaction severity without altering treatment timing. If confirmed, this approach could improve the safety and accessibility of food challenges in young children.

This has been an *AudioAbstract*, and I'm Ryan Quigley. To hear more episodes, visit ReachMD.com, where you can Be Part of the Knowledge. Thanks for listening.

Reference:

Freigeh GE, O'Shea KM, Troost JP, Kaul B, Franco LM, Schuler CF. Transepidermal Water Loss in Oral Food Challenges in Children With Peanut Allergy: A Randomized Clinical Trial. *JAMA Netw Open.* 2025;8(11):e2543371. doi:10.1001/jamanetworkopen.2025.43371