



CONTACT DERMATITIS AND OCCUPATIONAL DERMATOSES

## EXAMINATION OF POSITIVE PATCH TEST REACTIONS USING OPTICAL COHERENCE TOMOGRAPHY: A PILOT STUDY

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**Introduction:** Patch testing is the gold standard for evaluating allergic contact dermatitis (ACD). Current methods of interpreting patch tests are limited by their subjectivity and variability between observers. Optical coherence tomography (OCT) is an imaging modality that enables noninvasive *in vivo* skin visualization and holds promise as an objective method of patch test interpretation.

**Objective:** This pilot study aims to describe the micromorphological changes of ACD and identify objective, quantitative OCT markers that correlate with clinically-graded patch test reactions.

**Materials and Methods:** Patients with positive patch test reactions underwent OCT evaluation following clinical grading according to the International Contact Dermatitis Research Group guidelines. OCT measurements including attenuation coefficient and dynamic blood flow beneath the skin surface were obtained and compared across three reaction grades using one-way ANOVA. This study received Institutional Review Board approval at the University of Miami Institutional and all subjects provided written consent.

**Results:** A total of 25 patch test reactions (7 grade-0, 4 grade-1+, 14 grade-2+) from 7 subjects underwent OCT evaluation. Increased epidermal thickness and density was qualitatively observed in grade 1+ and grade 2+ allergic reactions while well-demarcated, signal-free cavities were observed in all grade 2+ reactions. Attenuation coefficients significantly increased across the three reaction grades ( $2.58 \pm 0.092$ ,  $2.96 \pm 0.121$ ,  $3.05 \pm 0.065$ ;  $p < 0.01$ ). Cutaneous blood flow at 0.35 mm monotonically increased with reaction grade severity and blood measurements significantly differed across the three reaction grades ( $.053 \pm .011$  mm/s,  $.078 \pm .015$  mm/s, and  $.121 \pm .008$  mm/s;  $p < 0.01$ ).

**Conclusions:** OCT may help dermatologists differentiate clinical scoring of allergic reactions in patch test and thereby improve their diagnostic accuracy and interpretation of patch test reactions.

