AC rule, but knowledge alone may not allow discrimination between benign and malignant skin lesions.

Conclusions | Future studies of MTD could benefit from target-
ing partner-assisted SSEs, increasing the number of SSEs to gen-
erate more lesions submitted for telediagnosis, assessing the
effect of dermatologists’ feedback between SSE rounds, and
submitting lesion location photographs. The process of le-
son selection decision making using MTD or other lesion se-
lection aids merits further investigation.

Monika Janda, PhD
Lois J. Loescher, PhD
Parastoo Banan, MD
Caitlin Horsham, BHealthSc
H. Peter Soyer, MD

Author Affiliations: School of Public Health, Institute of Health and Biomedical
Innovation, Queensland University of Technology, Brisbane, Australia (Janda,
Horsham); College of Nursing, The University of Arizona, Mel and Enid
Zuckerman College of Public Health, and Skin Cancer Institute, Tucson
(Loescher); Dermatology Research Center, The University of Queensland,
School of Medicine, Translational Research Institute, Princess Alexandra
Hospital, Brisbane, Australia (Banan, Soyer).

Corresponding Author: Monika Janda, PhD, Queensland University of
Technology, Victoria Park Rd, Kelvin Grove, QLD 4068, Brisbane, Australia
(m.janda@qut.edu.au).

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Study concept and design: Janda, Loescher, Soyer.

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Analysis and interpretation of data: Janda, Loescher, Horsham, Soyer.

Drafting of the manuscript: Janda, Loescher, Horsham.

Critical revision of the manuscript for important intellectual content: All authors.

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Thoroughness of skin examination by melanoma patients: influence of age, sex

6. Hanrahan PF, Hersey P, D’Este C. Factors involved in presentation of older

Laser-Speckle Contrast Imaging: A Novel Method for
Assessment of Cutaneous Blood Flow in Perniosis

Perniosis is a local inflammatory disorder caused by pro-
longed exposure to nonfreezing cold. The pathogenesis of this
disorder is not fully understood but is likely of microvascular
origin.

We describe a novel method to evaluate cutaneous
blood flow in a typical patient with perniosis, a woman in her
20s who was referred to the dermatology clinic with a
10-day history of painful purple discoloration on her toes
that began shortly after running in cold weather. She had no
lesions on her fingers and no systemic symptoms except for
fatigue. Her family history was negative for autoimmune
disease. The results of a workup that included complete
blood count, antinuclear antibody cryoglobulins, and
cold agglutinins were negative except for a slightly
decreased white blood cell count and 8% atypical lympho-
cytes, which later normalized. She was placed on a regimen
of nifedipine (10 mg twice daily). Her skin symptoms
resolved during 3 months but recurred when exposed to
cold and when stopping nifedipine.

Methods | This study was approved by The Pennsylvania State
University institutional review board. Both written consent and
verbal consent were obtained from the participants. Measure-
ments were obtained weekly for 4 weeks during the course of
therapy. The protocol was repeated in a healthy age- and sex-
matched individual.

The patient donned a water-perfused suit that covered the
total body and was instrumented with thermocouples on the
dorsomedial, lateral, and mid-right foot for measurement of
skin temperature. A laser Doppler flowmetry probe in a local
heater was placed on the left foot in an area unaffected by ul-
cerations. Blood pressure was measured continuously through-
out the protocol.

First, 33°C water was perfused through the suit for ther-
moneutral measurements, and then 48°C water was per-
fused to increase the mean skin temperature and stimulate cu-
taneous vasodilation. A laser-speckle contrast image (LSCI)
(moorFLPI; Moor Instruments) was obtained of the right foot
to visualize cutaneous blood flow throughout the protocol.
The patient was returned to thermoneutral, and the local heater
on the left foot was increased to 42°C to induce local endo-
thelial nitric oxide synthase-dependent vasodilation. Laser
Doppler flux under the local heater was measured through-
out local heating. Cutaneous vascular conductance (CVC) was
calculated as an index of skin blood flow using the following
equation: CVC = Flux/MAP, where MAP indicates the mean ar-
terial pressure.

Results | Figure 1 shows an LSCI and the mean skin tempera-
ture of the right foot of a healthy control subject (left pan-
els) and the patient with perniosis at baseline (middle panels) and following 4 weeks of nifedipine treatment (right panels) during thermoneutral (A) and warming (B) conditions. No appreciable differences were observed between the patient and the control subject at thermoneutral. The patient had reduced cutaneous vasodilation and lower skin temperature in her foot during whole-body warming.

Figure 2 shows a representative tracing of cutaneous blood flow (cutaneous vascular conductance [CVC]) response to local heating (A) and plateau in CVC due to local heat data from the left foot of a healthy control subject and the patient with perniosis at baseline and following 4 weeks of nifedipine treatment (B). The patient had a lower cutaneous vasodilation response to local heating at baseline. Cutaneous vasodilation responses were increased following 4 weeks of treatment. CVC is given as laser Doppler flux divided by the mean arterial pressure. Time is in minutes, with each hash mark on the x-axis representing 10 minutes.

Discussion | This case highlights the LSCI as a novel method for assessment of cutaneous blood flow in patients with cold-related disorders. In the patient with perniosis, cutaneous blood flow of the foot assessed with an LSCI was reduced, and microvascular reactivity to an endothelial nitric oxide syn-
that a phase-dependent stimulus was decreased. Quantitatively, these microvascular responses to systemic and localized heat stimuli normalized during nifedipine treatment.

Cutaneous vasodilation responses to heating stimuli have been used to assess microvascular function in the forearm skin of humans with varying preclinical vascular disease.\(^5,6\) The new, noninvasive LSCI technology presents the opportunity to comfortably and easily examine regional variation in cutaneous perfusion, rendering its clinical application in assessment of cutaneous vascular pathologic conditions. Further research is warranted to determine if an LSCI can predict the occurrence of ulcerations in patients with pemphigus. Our data suggest that the LSCI can be used to examine cutaneous blood flow and to assess the efficacy of interventions in dermatology patients.

Anna E. Stanhewicz, MS
Sara B. Ferguson, MD
Rebecca S. Bruning, BS
Lacy M. Alexander, PhD

Author Affiliations: Department of Kinesiology, The Pennsylvania State University, University Park (Stanhewicz, Bruning, Alexander); Penn State Hershey Medical Group, State College, Pennsylvania (Ferguson).

Corresponding Author: Lacy M. Alexander, PhD, Department of Kinesiology, The Pennsylvania State University, 113 Noll Laboratory, University Park, PA 16802 (lma191@psu.edu).

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Use of a Mobile Application to Characterize a Remote and Global Population of Acne Patients and to Disseminate Peer-Reviewed Acne-Related Health Education

Acne is estimated to affect 85% of all people at some point in their lives and has been associated with psychosocial morbidity. Education is an integral component to the treatment of acne, and it is recognized that many patients receive educational information about acne from sources other than health care professionals.\(^1\) Mobile applications (apps) have seen explosive growth since the introduction of smartphones, with annual download projections for health apps reaching as many as 142 million by 2016.\(^2\) The field of mobile health apps, still in its early stages, has been scrutinized for lack of comprehensive regulation and rigorous expert oversight. Despite the challenging start, well-designed apps remain promising tools for collection of data from large populations and for dissemination of health information,\(^3\) particularly the predominantly adolescent and young adult acne population that increasingly uses smartphones.\(^4\)

Methods | Based on observations of patients inquiring about dietary influence on acne, but lacking an accessible and credible mobile reference, we created a mobile app that systematically reviews current medical evidence on the topic. English language publications available online prior to March 15, 2013, were identified via PubMed literature search using search terms diet and acne and diet and nutrition. The peer-reviewed literature was systemically formulated into a mobile app, which was made available in English for download free of charge via the iTunes app store (Apple Inc) under the title “diet & acne.” After the app was made available, the institutional review board (IRB) at Northwestern University approved it along with a link within the app that takes users aged 18 years or older to a voluntary, anonymous survey. Survey items were developed to assess patient characteristics and patient interaction with the app. Data regarding app downloads and survey responses were collected via iTunes and Web Survey Creator, respectively, for a 5-month period starting April 1, 2013, and ending August 31, 2013.

Results | The diet & acne app was newly downloaded to 5507 devices in 98 different countries. Updates to the IRB-approved version of the app from the previously downloaded version totaled 2233. A total of 110 people who downloaded the app completed the survey. Self-reported characteristics of survey respondents are summarized in Table 1. Forty-one respondents (37.3%) reported that they had not seen a physician for their acne, and 96 (87.3%) reported acne duration greater than 1 year. A total of 105 respondents (96.3%) found the app by searching the iTunes app store with varied terms, the most common being acne (85.7%). Search terms and the estimated time users spent viewing the app prior to survey completion are detailed in Table 2.

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