Dry skin — does it really matter?

Neil Baker OBE
Consultant Podiatrist, 60 Degree Vascular and Diabetic foot Clinic, Bneid Al Gar, Kuwait

Welcome again to another *Diabetes Digest* and a selection of other papers you might find interesting and clinically applicable. The paper I have chosen is a European multicentre study looking at dry skin and ulcer risk. This was a prospective, multi-centre, observational study conducted at seven outpatient diabetes clinics in four European countries (Bulgaria, Greece, Serbia and the UK).

The aim of this study was to try to determine the role of dry skin as a marker of decreased sudomotor function using a Neuropad® (Skyrocket Phytopharma [UK] Ltd), a visual indicator plaster method (IPM), as a risk factor for foot ulceration alongside accepted screening tools for neurological deficits in patients with Diabetes Mellitus. A total of 367 patients were enrolled, of which 308 completed the study, which was of six years duration 2012–2017. The exclusion criteria included medical, non-diabetes-related neuropathies, and dermatological conditions, etc, that were associated with skin dryness.

The neurological screening tests undertaken were the neuropathy symptom score (NSS) and neuropathy disability score (NDS). Additionally, vibration perception threshold (VPT) was evaluated in a subset of participants. Dryness of foot skin was assessed by an IPM, which was placed on non-callused skin over the plantar metatarsal head area bilaterally. If the applied IPMs changed colour from blue to pink this was considered 'normal', however, if at least one remained blue or patchy, it was deemed abnormal — autonomic dysfunction.

All subjects were instructed to attend the study clinic immediately if they suspected an ulcer. Follow-up visits occurred regularly every 3–6 months; non-attenders were contacted by phone and asked if they had any foot ulceration. Those who did not respond were withdrawn from the study. The mean age was 62.81 ± 11.28 years; there was an equal sex distribution gender male/female 153/155 with a mean diabetes duration of 11.5 years. Ulceration occurred in 55 patients, giving a 2.97% annual incidence of foot ulceration. Ulceration subjects were older (P=0.030), had longer diabetes duration (P=0.045), more often DPN (P<0.001), worse all neurologic modalities (P<0.05), had more retinopathy (P<0.001) and CAD (P=0.009).

Multivariate Cox-regression analysis after controlling for the age, gender, and DM duration demonstrated that the risk (hazard ratio, 95% confidence intervals) of DFU increased significantly with either abnormal IPM (3.319, 1.460–7.545, P=0.004) or high (≥6) NDS (2.782, 1.546–5.007, P=0.001) or high (≥25 volts) VPT (2.587, 1.277–5.242, P=0.008). ROC analysis showed that all neurological modalities could discriminate participants who developed DFU (P<0.001). IPM testing showed high sensitivity (0.86) and low specificity (0.49), while high versus low NDS and VPT showed low sensitivity (0.40 and 0.39, respectively) and high specificity (0.87 and 0.89, respectively) for identification of patients at risk for DFU.

The authors, therefore, conclude that IPM is a valid ulcer screening tool. However, this a small study; there are a few study design issues; there is no quantification of skin dryness, e.g. skin capacitance; and the NDS is prone to error especially regarding tendon reflexes. Furthermore, the exclusion criteria and IPM cost would restrict routine clinical use. This, however, is an interesting study and I would suggest a prospective study examining ulcer prevention in at-risk patients related to skin rehydration in xerosis. Please read the full paper and see what you think. ■

Panagoulias GS, Eleftheriadou I, Papanas N et al (2020) Dryness of foot skin assessed by the Visual Indicator Test and risk of diabetic foot ulceration: a prospective observational study. *InFrontiers Endocrinol (Lausanne)* 11: 625

Diabet Med

Microbiological evaluation of resection margins of the infected diabetic foot ulcer

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! Factor	✓✓✓

1 The authors set out to evaluate surgical debridement's impact on the microbiology of resection margins of an infected diabetic foot ulcer (DFU), as well as comparing the use of marginal sampling to provide a guide for antimicrobial therapy.

2 Tissue samples from infected DFUs from a total of 40 consecutive participants were obtained by podiatrists at first contact. Multiple samples were obtained after surgical debridement from the margins of the residuum and also from excised non-viable tissue. Bacterial species were classified as either red group — definite pathogen causing infection; yellow group — likely to cause infection if present in more than one specimen; and the green group — commensals, not causing infection.

3 In the red group, there was a relative reduction of 49% (P=0.002) in bacteria, growing to 59% (P=0.002) in the yellow group. In addition, positive cultures from residuum margins were seen in three-quarters of cases (75%). The red group saw a relative reduction of 67% in bacteria, while the yellow group saw a 48% drop.

4 Following surgical debridement, positive cultures taken from marginal tissue samples provided key information on pathogenic bacteria, which enabled antibiotic regimens to be individualised post-surgical debridement.

Macauley M, Adams G, Mackenny P et al (2020) Microbiological evaluation of resection margins of the infected diabetic foot ulcer. *Diabet Med* e14440 [Online ahead of print]

Adv Wound Care

Evaluation of a novel three-dimensional wound measurement device for assessment of diabetic foot ulcers

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! Factor	✓✓✓✓

1 Despite the fact that initial wound measurement and regular monitoring of DFUs is crucial to establish a treatment plan, there is currently no standardised, universally accepted, assessment method to characterise DFUs in a quick, reliable and quantitative way. Therefore, the authors set out to assess a novel topographic imaging system used in the assessment of DFUs.

2 It was the WoundVue system that was assessed for this study, with 57 diabetic foot wounds seen from patients in a multidisciplinary foot clinic included. These wounds were photographed from two different angles and distances by using the WoundVue camera, with wound area, volume, and maximum depth all measured. Of these, 31 had their area calculated by using the established Visitrak™ system, with results from both systems examined.

3 The average percentage differences by using the WoundVue from different angles for assessment of different sizes and shapes of wounds were: 2.9% (95% confidence interval [CI]: 0.3-5.4), 12.9% (95% CI: 9.6-35.7), and 6.2% (95% CI: 2.3-14.7) for area, maximum depth, and volume, respectively.

4 To the authors' knowledge, this is the first human trial evaluating this novel 3D wound measurement device, which has the potential to be a valuable adjunct in diabetic foot wound care going forward.

Pena G, Kuang B, Szpak Z et al (2020) Evaluation of a novel three-dimensional wound measurement device for assessment of diabetic foot ulcers. *Adv Wound Care (New Rochelle)* 9(11): 623–31

Cardiovasc Diabetol

Use of the ankle-brachial index combined with the percentage of mean arterial pressure at the ankle to improve the prediction of all-cause mortality in type 2 diabetes mellitus: an observational study

Readability	✓✓✓✓
Applicability to practice	✓✓✓
WOW! Factor	✓✓✓✓

1 The ankle-brachial index (ABI) is a simple noninvasive method to screen peripheral artery disease (PAD). The authors hypothesised that by using ABI in conjunction with the percentage of mean arterial pressure (%MAP), this would improve the prediction of mortality.

2 For this study, data from patients with type 2 diabetes who had undergone ABI and %MAP measurements at the authors' hospital were retrospectively collected. The cohort was split into four groups according to their ABI and %MAP values, after which the indices were examined to determine whether or not they were associated with mortality.

3 The authors called upon 5,569 patients to the study and during the follow-up period (median was 22.9 months), 266 of the enrolled patients died, equating to 4.8%. Mortality prediction was found to be significantly more effective through the combination of ABI and %MAP.

4 The study concluded that the use of %MAP alongside ABI can significantly improve the prediction of all-cause mortality in those with type 2 diabetes.

Li Y-H, Sheu WH-H, Lee I-Te (2020) Use of the ankle-brachial index combined with the percentage of mean arterial pressure at the ankle to improve the prediction of all-cause mortality in type 2 diabetes mellitus: an observational study. *Cardiovasc Diabetol* 19(1): 173

Diabetes Obes Metab

Is routine measurement of the serum C-reactive protein level helpful during antibiotic therapy for diabetic foot infection?

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! Factor	✓✓✓✓

1 The evidence in support of monitoring serum C-reactive protein (CRP) levels is sparse or unclear, despite clinicians frequently doing so. Therefore, the authors set out to correlate CRP levels of patients at study enrollment and at end of treatment, using a database from prospective-controlled DFI trials, with a fixed duration of antibiotic therapy.

2 A total of 159 DFI episodes were included in the study, 66 of which involved soft tissues and 93 the bone. Treatment was found to be successful in terms of 122 infections (77%), while the remaining 37 episodes (23%) recurred after a median of 53 days.

3 At enrollment, the median CRP in the groups with cure versus recurrent infection differed minimally (median 67 mg/L vs. 81 mg/L) or at the end of treatment (7 mg/L vs. 10 mg/L), while there was negligible difference in the percentage of CRP levels that normalised by the end of therapy (39% vs. 35%).

4 The authors found that the iterative monitoring of CRP during DFI treatment failed to predict treatment failures.

Pham T-T, Wetzel O, Gariani K et al (2020) Is routine measurement of the serum C-reactive protein level helpful during antibiotic therapy for diabetic foot infection? *Diabetes Obes Metab* doi: 10.1111/dom.14222. [Online ahead of print]

> ***"I would suggest a prospective study examining ulcer prevention in at-risk patients related to skin rehydration in xerosis."***