

Diamonds on the soles of her shoes: Is diabetes footwear worth the expense?



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After staff, the largest single cost item in our clinic is diabetes footwear and insoles. Despite this, there is very little evidence for this expensive intervention and how best to achieve outcomes such as reduced re-ulceration rates and improved mobility for our patients. Clearly we believe that prescription shoes are needed for most patients in order to prevent re-ulceration, but is this actually the case? This quarter sees the publication of two papers from Amsterdam which take a critical look at the efficacy of footwear provision for diabetes patients (Arts et al, 2012 and Waaijman et al, 2013, summarised alongside). This group has an excellent track record and reputation for quality studies on shoes and insoles for diabetes patients.

The Arts study looked at custom made shoes, which often in the UK will cost over £500 per pair with insoles, and measured in shoe pressures at known sites of ulceration and forefoot deformity in 171 patients with 336 feet. It compared the regional maximum pressures with non-deformed feet or a peak pressure level of 200 kPa.

The conclusions were that pressures were adequately reduced in less than two-thirds of previous ulcer locations and less than a half of forefoot high-pressure areas caused by forefoot

deformity. The authors emphasised the need for more evidence-based interventions to enhance footwear efficacy. Certainly these findings, coupled with the fact that the shoes are worn less than 75% of the time when patients are walking, as published in the paper from the same group (summarised alongside), go a long way to explaining why shoes do not prevent re-ulceration in so many patients. Insoles need to be reviewed regularly and frequently replaced to ensure offloading is correct and maintained.

What else can we do about this? The Waaijman paper concludes that separate shoes for indoor wearing would help and also that more attractive shoes are more likely to be worn, and this is certainly my experience with my patients. Unfortunately, when feet are severely deformed this is not always possible but when custom shoes cost more than a pair of Prada or Louboutins then patients need better choice and more stylish footwear to encourage wearing, or else this is money we are spending which might not have any benefits for many patients and is an area that the NHS is looking at for possible cuts.

Arts ML, Waaijman R, de Hart M et al (2012) Offloading effect of therapeutic footwear in patients with diabetic neuropathy at high risk for plantar foot ulceration. *Diabetic Medicine* 29: 1534–41

DIABETES CARE

Patient adherence to prescription footwear is low

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 Ulcer recurrence in people with diabetes can be significantly reduced when patients wear custom-made footwear consistently. However, yearly recurrence rates are high and objective data examining adherence to prescription footwear are lacking.

2 The authors aimed to objectively measure adherence in 107 people with diabetes using a temperature-based monitor placed inside prescription footwear. Daily step count was simultaneously measured by an ankle-worn activity monitor.

3 Adherence to wearing custom-made footwear was quantified by the percentage of steps taken in prescription footwear. Mean ± standard deviation adherence was 71 ± 25%. Adherence was found to be lower at home (61 ± 32%, over 3959 ± 2594 steps) compared to outside the house (87 ± 26%, over 2604 ± 2507 steps).

4 Multivariate regression analysis revealed that lower BMI ($P=0.066$), greater foot deformity ($P=0.034$) and more aesthetically pleasing footwear ($P=0.032$) were significantly correlated with improved adherence. A total of 35 participants displayed low adherence (<60%). In this group, adherence at home was 28 ± 24%.

5 The authors concluded that adherence to wearing prescription footwear is low, especially in the home environment. These findings can be used in the development of schemes to improve adherence and reduce ulcer recurrence in people with diabetes.

Waaijman R, Keukenkamp R, de Haart M et al (2013) Adherence to wearing prescription custom-made footwear in patients with diabetes at high risk for plantar foot ulceration. *Diabetes Care* 36:1613–8

DIABETES METAB RES REVIEW

NRDs: Effective for healing foot ulcers

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓✓

1 Offloading devices such as removable cast walkers and therapeutic shoes are often prescribed to people with diabetes for the treatment of neuropathic foot ulcers.

2 The authors investigated the efficacy of multiple offloading devices in treating diabetic foot ulcers. A systematic literature search identified 1003 full text articles for inclusion.

3 Non-removable offloading devices (NRDs) were more effective at stimulating ulcer repair (RRp=1.43; 95% CI, 1.11–1.84; $I^2=66.9\%$; $P=0.001$; $k=10$) compared to removable devices. NRDs were also more effective compared to therapeutic shoes (RRp=1.68; 95% CI, 1.09–2.58; $I^2=71.5\%$; $P=0.004$; $k=6$). Comparison of total contact casts and instant total contact casts revealed no difference in efficacy between NRDs.

4 The authors concluded that NRD use was associated with improved rates of ulcer healing compared to removable off-loading devices.

Morona JK, Buckley ES, Jones S et al (2013) Comparison of the clinical effectiveness of different off-loading devices for the treatment of neuropathic foot ulcers in patients with diabetes: a systematic review and meta-analysis. *Diabetes Metab Res Rev* 29: 183–93

COCHRANE DATABASE
SYST REV**Non-removable casts associated with increased healing**

Readability	✓✓✓
Applicability to practice	✓✓✓
WOW! factor	✓✓✓

1 Diabetic foot ulcers often occur as a result of abnormal pressures on the sole of the foot. Plantar pressure relief is a common treatment for diabetic foot ulcers, but the most effective method for healing is unknown.

2 The authors aimed to assess the effects of different pressure relieving treatments on the healing of diabetic foot ulcers.

3 Electronic searches of the Cochrane Wounds Group Specialised Register, the Cochrane Central Register of Controlled Trials, the Cochrane Library, Ovid MEDLINE, Ovid EMBASE and EBSCO CINAHL were conducted. A total of 14 randomised controlled trials with 709 participants were included.

4 Non-removable casts were associated with an increased number of healed ulcers compared with removable devices (risk ratio [RR], 1.17; 95% CI, 1.01–1.36; $P=0.04$).

5 A higher proportion of ulcers healed with the use of non-removable casts compared with dressings. When used together, Achilles tendon lengthening paired with a non-removable cast healed significantly more ulcers at 7 months (RR, 2.23; 95% CI, 1.32–3.76) and 2 years (RR, 3.41; 95% CI, 1.42–8.18) compared to the sole use of a non-removable cast.

6 Non-removable interventions were found to be more effective in ulcer healing than other external pressure-relieving devices. Non-removable casts and Achilles tendon lengthening were more successful when used together than a solitary non-removable cast.

Lewis J, Lipp A (2013) Pressure-relieving interventions for treating diabetic foot ulcers. *Cochrane Database Syst Rev* **1**: CD002302

J WOUND CARE

Soft-heel casting may be cost-effective and efficacious

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 An economic audit of patient outcomes ($n=19$) associated with soft-heel casting for diabetic ulcer management and prevention was conducted at NHS Borders; the cost effectiveness of soft-healed casting was compared to other currently available off-loading interventions.

2 Soft-heel casting comprises of semi-rigid tape, which is placed around existing primary dressings and secured with a secondary dressing.

3 A cost consequence analysis revealed that soft-heel castings could decrease the cost diabetic foot ulcer treatment by 10%. This would reduce expenditure by approximately £500 per inpatient, £425 per outpatient and £205 per high-risk patient, if used as a preventative measure.

4 The authors concluded that soft-healing casting is an economically beneficial treatment option for the management of diabetic foot ulcers.

Craig J, Shenton R, Smith A (2013) Economic analysis of soft-heel casting for diabetic foot ulcer: prevention and treatment. *J Wound Care* **22**: 44–8

CLIN INFECT DIS

New IDSA guidelines for treating diabetic foot infections

Readability	✓✓✓✓
Applicability to practice	✓✓✓✓✓
WOW! factor	✓✓✓

1 The Infectious Diseases Society of America (IDSA) have published new guidelines for treating diabetic foot infections. The authors propose a classification system to be used

alongside vascular assessment in determining which patients require hospitalisation, special imaging or surgical intervention.

2 Healthcare professionals should classify infection and then stratify by severity. Tissue culture results, clinical and epidemiological data should inform antibiotic regimen and definitive therapy.

3 The IDSA highlight the necessity of multidisciplinary foot care teams in improving patient outcomes. Lipsky BA, Berendt AR, Cornia PB et al (2012) 2012 Infectious Diseases Society of America clinical practice guideline for the diagnosis and treatment of diabetic foot infections. *Clin Infect Dis* **12**: 1679–84

J FOOT ANKLE SURG

Outcomes after foot surgery in diabetes

Readability	✓✓✓
Applicability to practice	✓✓✓✓
WOW! factor	✓✓✓

1 Evidence suggests that poorly controlled diabetes is associated with adverse postoperative outcomes after foot and ankle surgery.

2 The authors aimed to retrospectively document the factors associated with poor bone healing in a cohort of 165 individuals with diabetes.

3 In total, 25.6% of participants experienced one or more bone healing complications. The presence of peripheral neuropathy, surgery duration, and HbA_{1c} levels >7% (>53 mmol/mol) were significantly associated with complications including nonunion, delayed union and malunion. Of these, peripheral neuropathy had the greatest correlation with bone healing complications (odds ratio, 3.93; 95% CI, 1.16–9.59).

4 The authors concluded that diabetes related comorbidities were significantly associated with adverse outcomes after foot and ankle surgery. Shibuya N, Humphers JM, Fluhman BL et al (2013) Factors associated with nonunion, delayed union, and malunion in foot and ankle surgery in diabetic patients. *J Foot Ankle Surg* **52**: 207–11

“The Infectious Diseases Society of America highlight the necessity of multidisciplinary foot care teams in improving patient outcomes.”