Introducing more effective service provision to reduce amputation and ulceration

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Diabetic foot complications, as we all know, are devastating to those who suffer from them and lead to increased morbidity, reduced quality of life and increased mortality. Additionally, demands placed upon the health and social care systems are unacceptably high. It is recognised that well-structured and integrated diabetic foot care services between primary and secondary care are effective in reducing diabetic foot complications. Measuring success is generally conducted by looking at major amputation levels and comparing them locally and regionally.

The paper I want to bring to your attention to is focused on improving diabetic foot care services and outcomes. When major amputation rates were published fairly recently, the south west of England had one of the highest rates compared with other parts of the UK. A study undertaken by Paisey et al, published in *Diabetic Medicine*, has examined the impact of changes to service upon diabetes-related major amputations and ulceration rates within the south-west region of England.

Following the introduction of 10 key elements of foot care service provision in one south-western area in 2007, stabilisation of foot ulcer incidence and sustained reduction in amputations were achieved. The key elements included: administrative support, standardised general practice foot screening, improved community podiatry staffing, hospital multidisciplinary foot clinics, effective care pathways, as well as the availability of an orthotist and audit. These changes were encouraged to be undertaken throughout the south-west region. Peer reviews of services were carried out in 2013 were conducted by two diabetologists, two lead podiatrists and an NHS England quality improvement lead. This showed that the 3-year diabetes-related major amputation incidence correlated inversely with adequate delivery of diabetes foot care services (P=0.0024, adjusted R^2=0.51). Further service recommendations were made and, in 2015, another peer review was conducted by a panel, including two diabetologists, two lead podiatrists, a vascular surgeon, an NHS quality improvement lead and an orthopaedic/podiatric surgeon. None of these reviewed their own services. These reviews found that two or more foot care service improvements were reported by six diabetes foot-care providers, with an improvement in outcomes. The negative relationship between major amputation incidence and service provision remained strong both in the period 2012–2015 and in 2015 only (P≤0.0012, adjusted R^2=0.56, and P=0.0005, R^2=0.62, respectively).

This commentary is not able to describe the methodology in full due to word constraints, but there are some very clear messages that commissioning groups should consider when looking at diabetic foot care services. Ultimately, as the authors conclude: the incidence of major lower-limb amputation is inversely correlated with foot-care services provision. By introducing more effective service provision, significant reductions in major amputation and ulceration can be achieved. Many of the improvements, according to the authors, are inexpensive and improve patient care. ■

Paisey RB, Abbott A, Levenson R et al (2017) Diabetes-related major lower limb amputation incidence is strongly related to diabetic foot service provision and improves with enhancement of services: peer review of the South-West of England. *Diabet Med* doi: 10.1111/dme.13512. [Epub ahead of print]

Diabet Med

Outcomes after first-time lower extremity revascularization for chronic limb-threatening ischemia between patients with and without diabetes

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

1 All limbs that underwent first-time infrainguinal bypass grafting (BPG) or percutaneous transluminal angioplasty with or without stenting (PTA/S) for CLTI (2005 to 2014) were reviewed, with 1,294 limbs fitting the authors' criteria. Patient categorisation was either insulin-dependent diabetes (IDDM), noninsulin-dependent diabetes (NIDDM), or no diabetes (NDM).

2 648 limbs had PTA/S and 646 had BPG — of these, 703 were IDDM, 329 NDM and 262 NIDDM. IDDM patients were younger, presenting more often with coronary artery disease, tissue and end-stage renal disease. Although, perioperative complications, including mortality, did not fluctuate between the groups, complete wound healing at 6-month follow-up was significantly worse in IDDM patients.

3 There were significantly higher 3-year major amputation rates and higher RAS event occurrence in IDDM patients, compared with NDM. NIDDM is associated with lower long-term mortality and few adverse limb events.

4 The importance of having a knowledge of diabetes type, as well as the possible long-term benefits of BPG in certain individuals with IDDM with CLTI, were the key findings of this study.

Darling JD, Bodewes TCF, Deery SE et al (2017) Outcomes after first-time lower extremity revascularization for chronic limb-threatening ischemia between patients with and without diabetes. J Vasc Surg doi: 10.1016/j.jvs.2017.06.119. [Epub ahead of print]

Clin Biomech (Bristol, Avon)

Lower-extremity dynamics of walking in neuropathic diabetic patients who wear a forefoot-offloading shoe

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

1 The mechanisms of action of forefoot-offloading shoes and their association with offloading and gait stability are not necessarily clear.

2 A total of 10 neuropathic diabetic patients used a forefoot-offloading shoe, as well as a control shoe (the former on the right and the latter on the left foot). A 3D-instrumented gait analysis and simultaneous in-shoe plantar pressure measurement were employed to assess a 1.2m/s walk by each patient for the offloading efficacy of the shoes, as well as defining centre-of-pressure profiles and left-to-right symmetry in ankle joint dynamics.

3 It was found that peak forefoot pressures, vertical ground reaction force, plantar flexion angle, and ankle joint moment were reduced with the offloading shoe, compared with the control, as was the proximal-to-distal centre-of-pressure trajectory.

4 There was a 51% reduction in peak ankle joint power with the forefoot-offloading shoe as opposed to the control shoe; 1.61 (0.35) versus 3.30 (0.84) W/kg (mean (SD), $P<0.001$). The offloading shoe was also significantly associated with forefoot peak pressure ($R^2=0.72$, $P<0.001$).

5 There is a shift towards altering a neuropathic diabetic patient's gait towards reduced push-off power in forefoot-offloading shoes, but gait symmetry and stability are compromised.

Bus SA, Maas JC, Otterman NM (2017) Lower-extremity dynamics of walking in neuropathic diabetic patients who wear a forefoot-offloading shoe. *Clin Biomech (Bristol, Avon)* 50: 21–6 [Epub ahead of print]

Prim Care Diabetes

Hidden dangers revealed by misdiagnosed diabetic neuropathy: A comparison of simple clinical tests for the screening of vibration perception threshold at primary care level

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

1 The early detection of diabetic peripheral neuropathy sees a reduction in amputations and foot ulcers, and this study aimed to compare numerous screening modalities used to detect diabetic peripheral neuropathy in a primary care setting.

2 The prospective non-experimental comparative multi-centre cross sectional study centred on 100 people with type 2 diabetes of 10 years or more across various primary health centres, while the three screening modalities to be compared were the Vibratip, 128Hz tuning fork and neurothesiometer.

3 In terms of participants not perceiving vibrations, this was highest when using the VibraTip (28.5%), in second place was the neurothesiometer (21%), followed by the 128Hz tuning fork (12%).

4 In conclusion, this study shows that different instruments are more sensitive to vibration perception than others. In practice, different modalities should be used for people with diabetes, with further neurological evaluation needed in some situations.

Azzopardi K, Gatt A, Chockalingam N, Formosa C (2017) Hidden dangers revealed by misdiagnosed diabetic neuropathy: A comparison of simple clinical tests for the screening of vibration perception threshold at primary care level. *Prim Care Diabetes* doi: 10.1016/j.pcd.2017.09.004. [Epub ahead of print]

Int J Clin Pract

Diabetic foot infection: Antibiotic therapy and good practice recommendations

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

1 Inadequate tissue sampling, delays in culture results, drug allergies and the emergence of multidrug-resistant organisms can all confound targeted antibiotics choice.

2 This paper looked at the merits of multidisciplinary clinical assessment of diabetic foot infections, recommending narrow-spectrum, high dose, short duration antimicrobial therapy, while acknowledging that further research is required in these areas. This took the form of a literature review and subsequent expert discussion with consensus reached on the optimum management of diabetic foot infections.

3 With a specific focus on empirical antimicrobial therapy, this paper recommended that the choice of alternative oral agents and use of outpatient antibiotics would benefit clinicians involved in diabetic foot care. It was recognised that Gram-positive organisms represent the most common pathogens in diabetic foot infection.

4 Empirical antimicrobial therapy advice was the bedrock of this paper, as mentioned, and the authors argued that this type of therapy may be used as a framework for the development of local guidelines that will aid healthcare professionals in the management of diabetic foot infection.

Barwell ND, Devers MC, Kennon B et al (2017) Diabetic foot infection: Antibiotic therapy and good practice recommendations. *Int J Clin Pract* doi: 10.1111/ijcp.13006. Epub 2017 Sep 11

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