

## Lower limb complications

### Everybody wants to rule the world



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Over the past 10 years the 10g monofilament has ruled supreme over the old-fashioned screening tools of tuning forks and the clinical examination of reflexes. This is despite various papers extolling the virtues of other methods and some deriding the accuracy, sensitivity and specificity of the use of monofilaments alone as an effective screening technique. Now it would appear as though the evidence base for monofilaments has taken another bashing with the almost serendipitous publication of two papers, each proclaiming that the monofilament is flawed, long live the tuning fork.

The work of Meijer and colleagues (abstracted on page 37), wonderfully titled 'Back to basics in diagnosing diabetic polyneuropathy with the tuning fork!', and Miranda-Palma and colleagues' rather more soberly titled 'A comparison of the monofilament with other testing modalities for foot ulcer susceptibility' (see below) are case-controlled group comparisons. The papers

are based upon patients with and without foot ulceration rather than prospective screening studies (although these also exist and have similar findings). Between them they only compare 76 patients with past or present ulceration and 75 patients without ulceration. However, they raise enough questions to fuel my nagging doubts about the monofilament being robust enough to be used as a single tool in screening, and to justify my own approach that clinical examination and tuning forks are equally good for the rapid exclusion of foot ulcer risk.

So, to another passion of diabetic foot fetishists, particularly those of the American or surgical persuasion, the total contact cast. Guyton (see right) has reviewed his own practice, treating 70 patients with a total of 398 casts over 28 months. In keeping with most centres the casts were changed weekly (every 7.69 days). Astonishingly, 30% of patients had one or more cast injuries. All but one was minor, but it is important to warn patients that such injuries can occur and that they must have frequent cast changes and report any problems promptly. In our centre we leave the toes open, not quite the ideal but possibly safer!

### FOOT AND ANKLE INTERNATIONAL

### Iatrogenic problems arising from total contact casting

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

**1** The rates of iatrogenic complications of total contact casts (TCCs) have not been analysed in a single series of castings from a single physician's practice. This paper aimed to provide such analysis of a successive series of TCCs from a single physician's practice.

**2** The study consisted of 70 patients with severe peripheral neuropathy receiving a total of 398 TCCs over a 28-month period.

**3** Sixty-four of the 70 patients had diabetes, which corresponded to 367 TCCs. Six patients had idiopathic peripheral neuropathy, corresponding to 31 TCCs. Each patient, on average, had 5.69 sequential casts placed; each cast was in place for an average of 7.69 days.

**4** Iatrogenic complications arising because of the placing of TCCs resulted in 22 new ulcers: six pretibial ulcers; six midfoot ulcers; four forefoot or toe ulcers; five hindfoot ulcers; and one malleolar ulcer. Therefore, the overall complication rate was 5.52% per TCC placed. Thirty per cent of all patients suffered at least one complication. No pre-existing ulcer was made worse.

**5** Only one resulting complication was non-reversible: a patient suffered a proximal interphalangeal ulceration which resulted in the amputation of the second toe.

**6** The author states that the odds ratios for all complications did not amount to any statistical significance but do show trends. Therefore, he concludes that patients need to be informed of complications and risks prior to the application of a TCC.

Guyton GP (2005) An analysis of iatrogenic complications from the total contact cast. *Foot and Ankle International* **26**(11): 449-54

### DIABETES RESEARCH AND CLINICAL PRACTICE

### Tuning fork better than monofilament at predicting foot ulcers

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

**1** The main objective of this study was to determine the number of testing sites and the proportion needed to become devoid of feeling for the optimal assessment of foot ulcer susceptibility with the 10g monofilament.

**2** The 10g monofilament's sensitivity and specificity was also compared with other method such as the vibration perception threshold (VPT) and the modified neuropathy disability score (NDS), all of which have been shown to be effective predictors of foot ulcers.

**3** Fifty-two people with a current foot ulcer or a history of at least one, and who had previously shown sensitivity to the 10g monofilament, and 51 people with no current or history of foot ulcers were assessed with the monofilament at four sites on each foot, and the 128Hz tuning fork and the VPT at the halluces. Ninety-three per cent of all participants had type 2 diabetes.

**4** The VPT and the NDS had the highest sensitivities (0.92 for both). The 128Hz tuning fork, tested only at the halluces of each foot, had the same sensitivity as the 10g monofilament tested at four sites on each foot (0.86 for both).

**5** These results demonstrate that using the 10g monofilament may not be the best method of identifying individuals at risk of developing foot ulcers.

Miranda-Palma B, Sosenko JM, Bowker JH et al (2005) A comparison of the monofilament with other testing modalities for foot ulcer susceptibility. *Diabetes Research and Clinical Practice* **70**(1): 8-12

## DIABETES CARE

### Tuning fork better than monofilament at diagnosing polyneuropathy

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

**1** The International Consensus on the Diabetic Foot (ICDF) and the Dutch Nederlandse Diabetes Federatie-Centraal Beleids Orgaan (NDF/CBO) have published two of the many international and national scoring systems available to diagnose diabetic polyneuropathy (PNP).

**2** The aim of this study was to compare these two commonly used diagnostic tests in order to characterise a scoring system with a high predictive value for the diagnosis of diabetic PNP.

**3** Sixty-nine participants (24 with diabetic PNP, 24 with diabetes but no PNP and 21 controls without diabetes) had the ICDF and NDF/CBO scoring system tested upon them. Reproducibility was studied in a separate group of 13 people.

**4** Other scores were obtained as clinical standards: the diabetic neuropathy score; the diabetic neuropathic examination score; heart rate variability; the nerve conduction sum score; and a San Antonio consensus score.

**5** The validity and discriminative power of the ICDF and NDF/CBO scores were comparable to the other clinical standards obtained, although monofilaments (NDF/CBO) scored lower.

**6** The best predictive value, although good for all scores, was obtained for the 128 Hz tuning fork (NDF/CBO). Reproducibility of the NDF/CBO (monofilament and tuning fork) scores was high.

**7** In conclusion, the authors state that the tuning fork alone is a good enough tool to use in diagnosing diabetic PNP.

Meijer JW, Smit AJ, Lefrandt JD, et al (2005) Back to basics in diagnosing diabetic polyneuropathy with the tuning fork! *Diabetes Care* **28**(9): 2201–5

## DIABETIC MEDICINE

### Ulcer-free survival could indicate a care unit's performance

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

**1** This prospective observational study aimed to discover the value of documenting ulcer-free survival.

**2** Ulcer-free survival rates were determined for a consecutive group of people referred to a specialist unit who had diabetic foot ulcers. Ulcer-free survival was determined as a combination of no recurring ulcers and intact limbs.

**3** The number of people presenting with diabetic foot ulcers, over a 31-month period, who became ulcer-free with intact limbs were documented in a specially written database.

**4** Three hundred and seventy people with a total of 1031 ulcers were referred to the authors' specialist clinic. A total of 121 patients did not become ulcer

free and 12 had their ulcers resolved by amputation. Two hundred and thirty-one patients became ulcer free at some point, five of whom were excluded owing to an earlier amputation.

**5** Ninety-one patients developed at least one recurring ulcer within a mean of 126 days. Of the 135 who did not develop any recurring ulcers, 133 survived ulcer free with their limbs intact (two died).

**6** Those who never became ulcer free were older and had a higher prevalence of ischaemia compared with those who remained ulcer free. Those who went on to develop new ulcers had a higher prevalence of neuropathy compared with those who remained ulcer free.

**7** The authors conclude that ulcer-free survival can be used as a gauge of a specialist unit's foot ulcer management and could be adopted to compare performance between different units.

Pound N, Chipchase K, Treece F, Game F, Jeffcoate W (2005) Ulcer-free survival following management of foot ulcers in diabetes. *Diabetic Medicine* **22**(10): 1306–9

## LANCET

### Negative pressure wound therapy better than conventional moist methods

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

**1** The authors of this study conducted a multicentre, randomised controlled trial (in the US) in order to study the effects of negative pressure wound therapy (NPWT) in improving wound healing in people who have had partial foot amputations due to their diabetes.

**2** One hundred and sixty-two people were recruited to this 16-week trial if they had foot amputation wounds up to the transmetatarsal level that were being adequately perfused.

**3** Participants randomised to NPWT (n=77) received treatment with dressing changes every 48 hours; the

control group received standard moist wound care according to consensus guidelines. Those in the NPWT group had NPWT delivered by the Vacuum Assisted Closure (VAC) Therapy System (KCI Medical, Kidlington, UK).

**4** Significantly more participants' wounds healed in the NPWT group compared with the control group (56% vs 39%;  $P=0.040$ ). The rate of wound closure was also significantly faster in the NPWT group ( $P=0.005$ ).

**5** Granulation tissue formation was also significantly faster in the NPWT group ( $P=0.002$ ). The severity of adverse events was similar across both groups.

**6** The authors conclude that the NPWT delivered by the VAC Therapy System is an effective and safe means of treating complicated diabetic foot wounds with the potential of reducing re-amputation rates compared with standard wound care.

Armstrong DG, Lavery LA; Diabetic Foot Study Consortium (2005) Negative pressure wound therapy after partial diabetic foot amputation: a multicentre, randomised controlled trial. *Lancet* **366**(9498): 1704–10

*'Ulcer-free survival can be used as a gauge of a specialist unit's foot ulcer management and could be adopted to compare performance between different units.'*

*'The tuning fork alone is a good enough tool to use in diagnosing diabetic polyneuropathy.'*