

Lower limb complications

Can we fix it? Yes we can



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The diagnosis and management of Charcot feet remains one of the most difficult challenges in diabetic foot care. Delayed recognition, and the absence of a proven specific treatment to limit the period

of active bone destruction, means that, even with prolonged casting and non-weight-bearing, significant deformity can develop. I take issue with those, such as Assal and Stern (2009, summarised alongside), who see this outcome as a failure of non-surgical management.

The question of whether to operate, and when, on feet affected by Charcot, is a dilemma faced by diabetic foot care multidisciplinary teams on a regular basis. In my view, surgery during the active phase of bone destruction and remodelling is fraught with problems. Pins, plates and external fixation wires can loosen or become infected, increasing the amount of destructive change and failing to limit the extent of deformity. It is usually better to treat a person clinically during the active phase and into the solid, consolidated phase before surgically correcting any resultant deformity.

Medial column surgery is generally held to have better outcomes than ankle or lateral column surgery, and the series by Assal and

Stern (2009) adds some weight to this position. There are, however, provisos. All the patients had surgery. There is no discussion about case selection and so, as an uncontrolled case series, it is hard to generalise about applicability to all patients with midfoot Charcot deformity and ulceration.

The surgical team were meticulous in the eradication of infection prior to surgery, and infection has to be a major consideration in such procedures. Despite all the authors' precautions, one third of the procedures reported did not result in a stable, uninfected, united, foot. However, only one person underwent an amputation and most (13/15, 87%) were mobile in appropriate foot wear, which is a good outcome.

In the hospital at which I work, my orthopaedic colleagues and I are willing to consider such surgery, but in general we opt for osteotomies. This reduces deformity and pressure points, and limits the amount of extraneous metal placed into the foot. We find that this procedure gives our orthotist colleagues a better foot to shoe, and gives our patients a chance at remaining ulcer free. I suspect that the best path for treatment of Charcot-induced midfoot deformity lies somewhere between my conservatism and Assal and Stern's (2009) more radical approach.

JOURNAL OF BONE AND JOINT SURGERY

Surgical management of midfoot deformity

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

1 Following the failure of non-surgical interventions, midfoot deformity secondary to Charcot arthropathy may lead to rocker-bottom foot deformity in people with diabetes. The authors report the use of a medial column screw in the realignment and extended fusion for the treatment of midfoot deformities secondary to diabetic neuropathy.

2 Reconstructive surgery, using a mid-column screw for realignment and arthrodesis, was performed in 15 people (13 with chronic, active, plantar ulceration; aged 34–70 years) with collapsed plantar arches and rocker-bottom deformity.

3 Outcomes measured comprised healing of ulcer and surgical wounds, union of arthrodesis, complications, and need for amputation. Postoperatively, participants progressed from a non-weight-bearing cast, to a removable weight-bearing cast, and finally to full weight-bearing extra-depth wide-toe shoes as their healing allowed. Mean follow-up was 42 months.

4 By study end, 13 participants were able to walk in full-weight bearing custom-made shoes. No plantar ulcer recurrence occurred. One amputation was required. Four feet failed to achieve union, one of which required further surgical intervention.

5 While being a technically demanding procedure, the use of medial column screws to treat midfoot deformities secondary to diabetic neuropathy was found to have an acceptable degree of complications, despite a high rate of non-union, and to be a sound alternative to amputation in some cases.

Assal M, Stern R (2009) Realignment and extended fusion with use of a medial column screw for midfoot deformities secondary to diabetic neuropathy. *J Bone Joint Surg Am* **91**: 812–20

EUROPEAN JOURNAL OF VASCULAR AND ENDOVASCULAR SURGERY

Limb salvage following angioplasty

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

1 This study investigated the patency, clinical success and limb-salvage rate of combined subintimal and endoluminal angioplasty for the initial treatment of lower-limb ischaemic ulcers in people with type 2 diabetes.

2 A consecutive series of 176 limbs with various ulcer types were

treated with multi-level angioplasties by a hospital-based multidisciplinary diabetic foot team (MDFT).

3 At 12, 24, 36, 48 and 60 months the limb-salvage proportions were $89 \pm 2.6\%$, $83 \pm 3.8\%$, $80 \pm 4.6\%$, $80 \pm 4.8\%$ and $80 \pm 4.8\%$, respectively.

4 The authors recommended the consideration of endo- and extraluminal paths as flexible therapeutic facets in conjunction with MDFT input in the management of the ischaemic diabetic foot.

Alexandrescu V, Hubermont G, Philips Y et al (2009) Combined primary subintimal and endoluminal angioplasty for ischaemic inferior-limb ulcers in diabetic patients: 5-year practice in a multidisciplinary 'diabetic-foot' service. *Eur J Vasc Endovasc Surg* **37**: 448–56

CLINICAL INFECTIOUS DISEASES

Reliability of bone-infection diagnostic techniques

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

1 Transcutaneous bone biopsy is recommended for identifying bacteria in the bone of people with diabetes with suspected osteomyelitis of the foot. However, its reliability versus that of needle puncture sampling has not been reported.

2 In this prospective study across two hospital-based diabetic foot clinics in France, the authors concomitantly took needle puncture specimens, bone biopsy specimens and swab samples from 31 people (aged >18 years) with type 2 diabetes and suspected osteomyelitis.

3 The primary outcome was correlation between the culture results of each of the procedures. People who had recently received antibiotics, presented with gangrene or were found to need amputation on admission, were excluded.

4 The overall correlation between the bone biopsy and needle puncture techniques was 23.9%, with 13 of the 20 samples positive for infection using bone biopsy sampling being concurrently positive using the needle puncture sample.

5 Needle puncture alone would have returned a false positive for infection in five (16.1%) participants and a false negative in eight (38.1%), resulting in unnecessary treatment or no treatment where it was necessary, respectively.

6 The authors concluded that needle puncture sampling is less reliable in the detection of microorganisms in the bone of people with suspected low-grade infections of the diabetic foot than bone biopsy sampling.

Senneville E, Morant H, Descamps D et al (2009) Needle puncture and transcutaneous bone biopsy cultures are inconsistent in patients with diabetes and suspected osteomyelitis of the foot. *Clin Infect Dis* **48**: 888–93

DIABETES RESEARCH AND CLINICAL PRACTICE

Deep, recurrent, multiple wounds at increased risk of osteomyelitis

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

1 In this prospective study, the authors aimed to evaluate the risk factors for the development of osteomyelitis among people with diabetes.

2 Consenting participants were consecutively recruited from two primary healthcare practices in the US and were enrolled in a programme designed to prevent lower-limb amputations, beginning with screening for known risk factors for ulceration and amputation.

3 A total of 1666 people were screened and followed-up for a mean of 27.2 months (range 20–32 months) as part of their diabetes management programme. Of them, 247 (14.8%) developed foot wounds with 151 (9.1%) people developing 199 episodes of foot infection. Thirty (19.9%) of these infections were discovered to extend to bone.

4 Wounds that extended to a bone or joint (relative risk [RR]=23.08), a history of ulceration (RR=2.15) and recurrent or multiple wounds during the study period (RR=1.92), were all found to be significant ($P=0.0001$, 0.03, 0.007, respectively) independent risk factors for the development of osteomyelitis.

5 Peripheral vascular disease was notably not a statistically significant risk for osteomyelitis ($P=0.6$).

6 The authors concluded that the identification of these independent risk factors should improve diagnostic efficiency.

Lavery LA, Peters EJ, Armstrong DG et al (2009) Risk factors for developing osteomyelitis in patients with diabetic foot wounds. *Diabetes Res Clin* **83**: 347–52

THE LANCET

Fenofibrate reduces risk of amputation

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

1 The authors aimed to determine the effects long-term lipid-lowering treatment with fenofibrate on the rate of amputations among people with diabetes, based on the agent's reduction of microvascular disease.

2 The Fenofibrate Intervention and Event Lowering in Diabetes (FIELD) study randomised 9795 people (aged 50–75 years) with type 2 diabetes to receive fenofibrate (200 mg once daily; $n=4895$) or placebo ($n=4900$).

3 During the study period, 115 participants experienced one or more diabetes related lower-limb amputations.

4 The risk of both first amputation (hazard ratio [HR] 0.64, 95% confidence interval [CI] 0.44–0.94; $P=0.02$) and minor amputation without known large-vessel disease (HR 0.53, CI 95% 0.30–0.94; $P=0.027$) was reduced among those participants randomised to receive fenofibrate over placebo.

5 No significant difference between the fenofibrate and placebo groups was seen in terms of the risk of major amputations during the study period ($P=0.79$).

6 Fenofibrate was found to be associated with reduced risk of amputation, particularly minor amputations, and the authors suggest that the probable mechanism is a non-lipid one.

7 The authors anticipate that standard treatment for the prevention of diabetes-related lower-limb amputations could change to include fenofibrate therapy.

Rajamani K, Colman PG, Li LP et al (2009) Effect of fenofibrate on amputation events in people with type 2 diabetes mellitus (FIELD study): a prespecified analysis of a randomised controlled trial. *Lancet* **373**: 1780–8

“Wounds that extended to a bone or joint, a history of ulceration and recurrent or multiple wounds during the study period, were all significant independent risk factors for the development of osteomyelitis.”