Lower limb complications

The ankle bone is (dis) connected to the foot bone

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Charcot neuroarthropathy is a serious, under-recognised complication of diabetes. It is more common than visual loss due to diabetes and yet it is not routinely assessed or detected. Late referral of severely deformed Charcot feet occurs in at least 25% of the cases I see. The foot is often severely distorted and surgical correction is required, although ideally not until the active process has been controlled by casting, immobilisation, and perhaps the use of pharmacotherapy with bisphosphonates.

Lueterrs et al describe risk factors for foot fractures in elderly patients. Diabetes, impaired vision and reduced sensation all contribute to increased risk of foot fractures in the general public. It is therefore not surprising that Charcot feet are associated with other major diabetes complications; retinopathy, nephropathy and previous foot ulceration were all unifactorial predictors of Charcot risk in the study by Foltz et al. Their study also suggested that increased levels of neuropathy were highly predictive of Charcot feet but not vasculopathy. Whilst these findings are largely confirmatory of what is known about Charcot neuroarthropathy, they act as a reminder for the more Charcot-phobic. They aid decisions of when to be suspicious of a warm swollen foot being an early Charcot, not osteomyelitis (unlikely if the foot has never had an ulcer), gout, or arthritis.

Early Charcot neuroarthropathy may have few or no signs on plain radiographs. Regional osteopaenia is a common feature with bone fragmentation and dislocation of the affected joints. Herbst et al postulate that people with preserved bone mineral density (BMD) develop a mainly dislocation pattern of neuroarthropathy and fractures occur in those with reduced BMD. This pattern holds reasonably well in the 55 patients they describe and might explain some the differences in presentation that are seen.

Unfortunately, the treatment of Charcot neuroarthropathy, even instigated early, does not guarantee that deformity will not occur. If this deformity results in pressure points or shoeing problems then late surgical correction may be required. Resch reviews the various ways surgeons operate on diabetic feet including arthrodeses for Charcot feet. However, she points out that few (if any) of the papers are controlled or randomised. The review by Garapati and Weinfeld focuses on Charcot feet and again highlights the lack of controlled studies in this area. Each centre sees relatively few patients and techniques are often specific to individual surgeons. Re-operation rates are high and a randomised multicentre trial of the most popular techniques should be commissioned.

JOURNAL OF FOOT AND ANKLE SURGERY

Patient history and simple testing best predictors of Charcot

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

1 This study aimed to determine which physical and historical findings are more accurate risk factor indicators in people with diabetes with and without Charcot foot deformity.

2 A total of 41 Charcot-free people with diabetes and 18 people with diabetes who had chronic Charcot foot deformity were evaluated using historical findings, physical examinations and a series of tests.

3 The results indicated that a thorough patient history combined with simple neurological testing were the most beneficial for determining those people with diabetes who had a higher probability of developing Charcot deformity.

4 History of retinopathy, previous foot ulcer and nephropathy were found to be predictive, and the neurologic findings of vibratory sensation, deep tendon reflexes and the 5.07 (10 g) Semmes-Weinstein monofilament test were highly correlative of Charcot deformity.

5 Vascular examinations differentiated poorly between groups.

6 Through application of these data, earlier detection of Charcot arthropathy based on the predictive capabilities could be a consequence.

Foltz KD, Fallat LM, Schwartz S (2004) Usefulness of a brief assessment battery for early detection of Charcot foot deformity in patients with diabetes. *Journal of Foot and Ankle Surgery* **43**(2): 87–92

OSTEOPOROSIS INTERNATIONAL

Foot fracture risks differ from risks for other sites

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

1 The objective of this case-control study was to identify risk factors for foot fractures in people ≥45 years.

2 A total of 920 foot fracture cases and 2366 frequency matched controls were interviewed using a questionnaire between October 1996 and May 2001.

3 Foot fractures occurred most often while climbing the stairs or walking.

4 Of foot fractures, 60% were due to falling; 20% were attributed to causes such as tripping on curbs.

5 Increased risk was associated with a self-reported history of physician-diagnosed diabetes or cataracts, a self-reported foot problem, difficulty walking in minimum light and having had a previous fracture.

6 Foot fracture risk was not associated with putative protective factors for osteoporotic fractures and high body mass index.

7 The researchers concluded that risk factors for foot fractures in older people may differ from risk factors for other fracture sites usually considered to be osteoporotic.

Luetters CM, Keegan THM, Sidney S et al (2004) Risk factors for foot fracture among individuals aged 45 years and older. *Osteoporosis International* **Apr 28** 2004: Epub ahead of print

THE AMERICAN JOURNAL OF SURGERY

Shoe modifications and bracing can relieve Charcot foot

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

1 The aims of surgical treatment of the diabetic foot are correction of deformity and elimination of infection, producing a plantigrade, stable foot.

2 Not all people with Charcot deformities need reconstruction, as many can be managed with shoe modifications with orthoses, or bracing to provide support and prevent further deformity.

3 The investigators believe that surgery should be used in people with an unstable foot or recent ulceration.

4 When the Charcot foot is reconstructed, the goals should be to eliminate deformity and remove high-pressure areas of the foot, preventing ulceration and infection.

Garapati R, Weingeld SB (2004) Complex reconstruct;ion of the diabetic foot and ankle. *The American Journal of Surgery* **187**(Suppl): 81S–86S

DIABETES/METABOLISM RESEARCH AND REVIEWS

A need for quality of life studies of Charcot foot treatment

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

1 Benchmarking studies show that up to 50% of people with diabetes and Charcot deformity of the foot undergo surgery, while textbooks advise lengthy conservative treatment.

2 Surgical procedures which are reported in diabetic foot deformity are: metatarsal head resection/ osteotomy; great toe amputation; calcanectomy; and a number of external and internal fixation techniques.

3 Although there is a high rate of complication in this surgery, studies in the area are mostly small and retrospective.

4 The author concludes that there is a need for well-controlled quality of life studies comparing methods of treatment of Charcot foot deformity.

Resch S (2004) Corrective surgery in diabetic foot deformity. *Diabetes/Metabolism Research and Reviews* **20**(Suppl 1) S34–36

DIABETES/METABOLISM RESEARCH AND REVIEWS

Advances in management of neuropathy

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

1 The researchers propose an increasingly balanced approach to neuropathic foot conditions that considers psychological factors.

2 Psychosocial research has previously focused on self-care behaviours and the management of glycaemia, while neglecting the effects of chronic complications.

3 An approach is advocated in which psychological and social concepts and measures are developed to capture how people perceive threats such as neuropathy, and how they respond to them.

4 Progress in this area can be seen by patient-centred, theory-based methods of identifying psychological factors that influence adherence behaviours, quality of life and emotional status in people with diabetes at high risk of developing foot ulcers.

5 There is room for the development of a conceptual model of patient's beliefs about foot complications, and educational methods to improve clinicians' abilities to empower patients to manage their neuropathy more efficiently.

Vileikyte L, Rubin RR, Leventhal H (2004) Psychological aspects of diabetic neuropathic foot complications: an overview. *Diabetes/Metabolism Research and Reviews* **20**(Suppl 1): S13–18

THE JOURNAL OF BONE AND JOINT SURGERY

Dislocation pattern of Charcot associated with normal BMD

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

1 The relationship between Charcot arthropathy and bone mineral density (BMD) is currently unclear.

2 The researchers hypothesised that Charcot changes may be subclassified by the initial pattern of injury, and that a fracture pattern may be associated with a deficient peripheral BMD.

3 A total of 55 people with diabetes who presented with a Charcot arthropathy of the foot or ankle were prospectively classified as having a fracture (23), dislocation (23), or a combination fracture-dislocation pattern (9) of initial destruction.

4 Dual-energy x-ray absorptiometry was used to compare the peripheral bone of the affected and unaffected limbs; clinical data relating to diabetes and comorbidities and the site of the arthropathy were also compared.

5 The age-adjusted odds ratio for developing a Charcot joint with a fracture pattern as opposed to a dislocation pattern in people with osteopaenia was 9.5, and the site of the arthropathy differed between the groups.

6 Dislocations predominated in the midfoot, but fracture patterns dominated at the ankle and forefoot.

7 The results indicate that diabetic Charcot arthropathy of the foot and ankle differs according to the pattern of the initial destruction.

8 The fracture pattern is associated with peripheral deficiency of BMD, and the dislocation pattern is associated with a normal BMD.

Herbst SA, Jones KB, Saltzman CL (2004) Pattern of diabetic neuropathic arthropathy associated with the peripheral bone density. *The Journal of Bone and Joint Surgery* **86**: 378–83

'When the Charcot foot is reconstructed, the goals should be to eliminate deformity and remove high-pressure areas of the foot, preventing ulceration and infection.'

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