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### **Paper:**

Taylor, K. & Bain, S. (2019). Foot deformity in a man with Type 2 diabetes. *Diabetic Medicine*

<http://dx.doi.org/10.1111/dme.13950>

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## **Foot deformity in a man with Type 2 diabetes.**

**Taylor K, Bain SC.**

### **Charcot Joint/Rocker Bottom Foot**



### **Introduction**

A 57 year old man presents to the diabetes clinic complaining of a swollen right foot. He has had Type 2 diabetes for 12 years and his most recent HbA<sub>1c</sub> was 97mmol/mol (11%). He has no history of trauma and is currently pain free, although admits slight discomfort when he first noticed the foot swelling 1 month ago. At that time he underwent an ultrasound Doppler of the right leg which ruled out deep vein thrombosis. The swelling has worsened since then to the extent his shoe no longer fits.

### **Questions**

1. What name is given to the condition and the clinical sign depicted?
2. How does this condition typically present?
3. Who was the physician eponymous with this condition?

### **Answers and Learning Points**

#### **Question 1**

The image shows the hallmark 'rocker bottom' deformity of mid-foot collapse associated with Charcot neuropathic osteoarthropathy, more commonly known as a Charcot foot [1]. Charcot neuropathic osteoarthropathy is characterised by the progressive degeneration of the bones and joints of the foot and ankle in people with peripheral neuropathy, resulting in fracture, dislocation and deformity. Charcot foot may occur as a complication of peripheral neuropathy of any aetiology, but is most frequently associated with diabetic neuropathy [2]. A recent publication found the prevalence of Charcot foot in the East Midlands of England to be 4.3 per 10,000 people with diabetes, however this figure may be higher due to misdiagnosis [3].

### Question 2

The onset of Charcot neuropathic osteoarthropathy is insidious and often begins with erythema, warmth and oedema of the foot which may be associated with only mild discomfort [1,4]. Examination typically reveals peripheral sensory deficit with preserved or bounding pedal pulses [1]. Owing to this presentation acute Charcot foot may initially be mistaken for a soft tissue injury, cellulitis, deep vein thrombosis, osteomyelitis or gout [5]. Impaired nociceptive and proprioceptive pathways within the foot allow the individual to continue weight bearing despite joint damage, which further weakens the joint [2,5]. If left untreated, the primary inflammation subsides to leave permanent residual bony and joint deformity. Treatment is centred on immobilisation of the affected foot with total contact casting to prevent weight bearing [5]. If this fails or if the foot is severely deformed, reconstructive surgery may be considered.

### Question 3

Charcot neuropathic osteoarthropathy is named after the French neurologist Jean-Martin Charcot who is widely regarded as the father of modern neurology [6]. Charcot's name is associated with many medical eponyms including Charcot-Marie-Tooth Disease, Charcot disease (amyotrophic lateral sclerosis, the commonest form of motor neurone disease) and Charcot Wilbrand Syndrome (visual agnosia following stroke or focal brain damage). Two triads also bear his name; Charcot's triad of ascending cholangitis (jaundice, fever and right upper quadrant pain) and Charcot's triad of multiple sclerosis (nystagmus, scanning dysarthria and intention tremor).

In 1868 Charcot described arthropathy in people with tabes dorsalis, demyelination of the dorsal column of the spinal cord due to tertiary syphilis [4,6]. Charcot noted how arthropathy developed following damage to the spinal cord in tabetic patients. William Jordan became the first person to link Charcot joint to diabetes mellitus in 1936 and diabetes has since overtaken syphilis as the most common cause of Charcot foot.

### Learning points:

1. Charcot neuropathic osteoarthropathy may arise from any condition causing peripheral neuropathy, however, it is most commonly associated with diabetes mellitus.
2. Charcot neuropathic osteoarthropathy is often mistaken for other conditions on first presentation therefore clinicians should maintain a high index of suspicion for Charcot foot in people with peripheral neuropathy presenting with lower limb swelling.

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