

Who was first to diagnose and report neuropathic arthropathy of the foot and ankle: Jean-Martin Charcot or Herbert William Page?

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Abstract In November 1883, Jean-Martin Charcot and Charles Féré reported on bone and joint disease of the foot in cases of tabes dorsalis, and referred to the condition as ‘*pied tabétique*’—a disabling neuropathic osteoarthropathy that we usually now refer to as the Charcot foot. Charcot had originally described neuropathic osteoarthropathy in more proximal joints in 1868, and in his 1883 paper with Féré stated that involvement of the short bones and small joints of the foot had not yet been described. They emphasised in the paper that one of their cases was the first ever observed, two years earlier, in 1881. It is relevant, however, that it was in this same year that involvement of the foot by tabetic arthropathy was presented to the International Medical Congress in London by an English surgeon, Herbert William Page. We believe that Page was the first to diagnose and to report a case of tabetic neuropathic osteoarthropathy in which the bones of the foot and ankle were involved. He was also the first to propose a link between the tabetic foot and disease of the peripheral nerves, as opposed to the central nervous system.

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Introduction

In November 1883, Jean-Martin Charcot and Charles Féré reported fracture dislocations of the foot in cases of tabes dorsalis [1], and suggested they were a manifestation of tabetic arthropathy, a group of conditions that had been described in the long bones and large joints of patients with locomotor ataxia by Charcot in 1868 [2–4]. This is generally regarded as the first ever description of the condition now known as the Charcot foot, which can complicate diabetes, leprosy (Hansen’s disease) and other causes of neuropathy. The 1883 paper listed five observations, including four cases of ‘*pied tabétique*’ (tabetic foot), and emphasised that one of their cases was the first ever observed, 2 years earlier, in 1881. It is relevant, however, that it was in 1881 that involvement of the foot by tabetic arthropathy had been reported at an international congress for the first time by a London surgeon, Herbert William Page.

Herbert William Page (1845–1926)

After an undergraduate career in Edinburgh and at Cambridge, Herbert W. Page (Fig. 1) received his clinical training at the London Hospital and qualified in 1870 [5, 6]. He then served as Assistant Surgeon in the Hessian Division of the Prussian Army during the Franco-Prussian War before returning to work with his father in Carlisle and later being appointed Surgical Registrar at the London Hospital in 1875.



Fig. 1 Herbert W. Page, MCh, FRCS (1845–1926) at the height of his career. Page was the first to diagnose and report tabetic arthropathy of the foot and ankle, and the first to propose a peripheral origin for this condition rather than a lesion of the brain or spinal cord [15]. From the Archives of the Royal College of Surgeons of England

In 1876, he was appointed Assistant Surgeon at St Mary's Hospital, London, where he served on the staff of the hospital as surgeon and teacher for 30 years. Page's surgery was said to be marked by meticulous attention to detail, and he was the first surgeon at St Mary's to rely on instruments and dressings sterilised by heat rather than by antiseptics. His chief work on injuries of the spine [7] was published in 1883, and he was later elected President of the Neurological Society of London. But it was in August 1881 that he reported involvement of the foot by tabetic arthropathy at the biennial International Medical Congress held that year in London.

7th International Medical Congress, London 1881

This meeting was described in *The Lancet* as having 'an audience the like of which has never been witnessed before and, in all probability will never meet again in the lifetime of the youngest member present' [8]. James Paget presided over the meeting, which was attended by many of the medical luminaries of the day, including Thomas Buzzard, John Hughlings Jackson, William Jenner, Robert Koch, Joseph Lister, William Osler, Louis Pasteur, Frederick Treves, Rudolf Virchow and Richard von Volkmann. The eminent French pathologist and neurologist, Jean-Martin Charcot, was also there and gave a presentation on tabetic disease of

the bones and joints. Charcot's presentation, entitled 'Demonstration of arthropathic affections of locomotor ataxy', was expertly illustrated with anatomical specimens of bones and joints, clinical photographs and sections of the spine demonstrating posterior sclerosis of the cord. The importance of this contribution to the understanding of spinal arthropathies was noted in the *Transactions of the International Medical Congress* [9], by Sir James Paget who wrote, 'This disease is, in fact, a distinct pathological entity, and deserves the name, by which it will be known, of "Charcot's disease"' and he later affirmed this in the *British Medical Journal* [10]. It should be noted, however, that just as in his earlier publication in 1868 [2, 3], Charcot's demonstration at the 7th International Medical Congress did not mention bone and joint involvement of the foot or ankle.

The presentation by Herbert W. Page at the London congress was entitled 'Joint disease in a case of tabes dorsalis (locomotor ataxy)', and was presented in the Museum of Living Specimens, an exhibition of living patients [9]. This attempt to illustrate rare diseases was a popular new addition to the Congress Museum. Page's patient was a 30-year-old man with tabes dorsalis and bilateral disease of the foot. It is worth noting that the term 'tabes dorsalis' (an anatomical description coined by Moritz Romberg) and the clinical term 'locomotor ataxy' (used by Duchenne de Boulogne) were used interchangeably. Duchenne was a man to whom Charcot referred as 'mon maître en neurologie' (my master in neurology) [11].

In his presentation, Page associated the bone and joint changes that he observed in this patient as being representative of the group of tabetic arthropathies described by Charcot in 1868. The Report on The Congress Museum [9] recognised Mr. Page's presentation with distinction: 'Charcot's joint disease, or that peculiar form of almost painless destructive disease of joints, which occurs in ataxic patients, was illustrated by several remarkable cases exhibited by Mr. Herbert Page and Mr. Charles Macnamara. At their demonstrations we had the advantage of Professor Charcot's presence, and of some remarks made by him.' It was noted that 'Charcot himself remarked when he saw the [Page's] case in London that only one instance of the same kind had fallen under his observation' [12, 13]. We can conclude that this instance was the one that Charcot later reported as presenting to him on 30th April of the same year.

Follow-up of Page's case

On 13 April 1883, Page presented his case, with a 2-year follow-up, to the Clinical Society of London. His report was entitled, 'A case of tabetic arthropathy in which the tarsal bones of both feet were involved' [12, 13]. Page noted the importance of recognising this rare condition in everyday practice, in order to prevent amputation. He believed that the

duty for this rested with the surgeons of general hospitals. He remarked, ‘And the practical importance of this recognition is abundantly shown by the history of this case. Had his left foot been the first affection seen, as it was seen on July 21, 1881, there can be little doubt that the foot would have been at once condemned and forthwith removed. It was by a mere accident, as it were, in the development of his symptoms that the patient still has his foot, deformed it is true, but better than any artificial limb’ [12, 13].

He went on, ‘When shown at the Congress on August 6, the swelling of the right foot had much subsided, and the bones, originally involved, seemed ankylosed [sic] together. The left foot, however, had gone on from bad to worse. It had gradually increased in size...the ankle suddenly slipping on one side. Crepitus could be obtained at the ankle joint, and the foot gave the sensation on handling of being a mere bag of loose bones. Manipulation was painless. Such a foot would, indeed, have called for immediate removal had not the nature of this case been known, and had not the subsidence of the swelling and the ankylosis [sic] of the bones of his right foot suggested the advisability of leaving his left foot alone. It was therefore secured in a plaster-of-Paris bandage’ [12, 13]. The decision to avoid amputation was vindicated by the fact that although the man had had to give up his job as a farrier, he was still ambulant and able to work in his garden when last seen in 1889 [14].

Rocker-bottom foot deformity

Herbert W. Page recorded with great clarity the earliest description of a rocker-bottom foot deformity, which is now the hallmark of midfoot collapse in the Charcot foot: ‘The sole of this foot is $4\frac{3}{4}$ inches wide, and there runs across it, midway between the heel and the toes, a hard transverse ridge, composed doubtless of the tarsal bones, for the base of the first

metatarsal bone has no longer a cuneiform bone to articulate with, and stands out as an abrupt projection on the dorsum. On this transverse ridge his foot rests on the ground, and you are able to get the tip of your little finger underneath his heel when he is standing’ [12].

Page links the tabetic foot with peripheral neuropathy

Page published a second case—that of a man in whom he made the diagnosis of ‘Charcot arthropathy’ when he presented with gross deformity of the foot and ankle in January 1882 [15]. The patient also gave a history of having had ‘perforating’ (now called ‘neuropathic’) ulcers of the feet over several years. Although the man had signs of tabes dorsalis, Page used this case to argue that in some cases of both perforating ulcers and tabetic arthropathy the underlying predisposing factor might be disease of the peripheral nerves. Although with hindsight the evidence seems not to have been strong, it is recognised today that peripheral (as opposed to central) neuropathy is by far the commonest predisposing cause of both neuropathic foot ulcers and the acute Charcot foot [16]. This second case is remarkable also in that the description strongly suggests that the inflammation and subsequent deformity of the ankle were preceded, and arguably triggered, by a neuropathic ulcer with probable osteomyelitis and subsequent amputation of the fourth toe of the same foot—a sequence of events that is now known to be not uncommon [16].

The 1883 publication by Charcot and Féré

Charcot and Féré first presented their observations on involvement of the tabetic foot to the Anatomical Society of Paris in 1883 [17], and their paper, ‘Affections Osseuses et

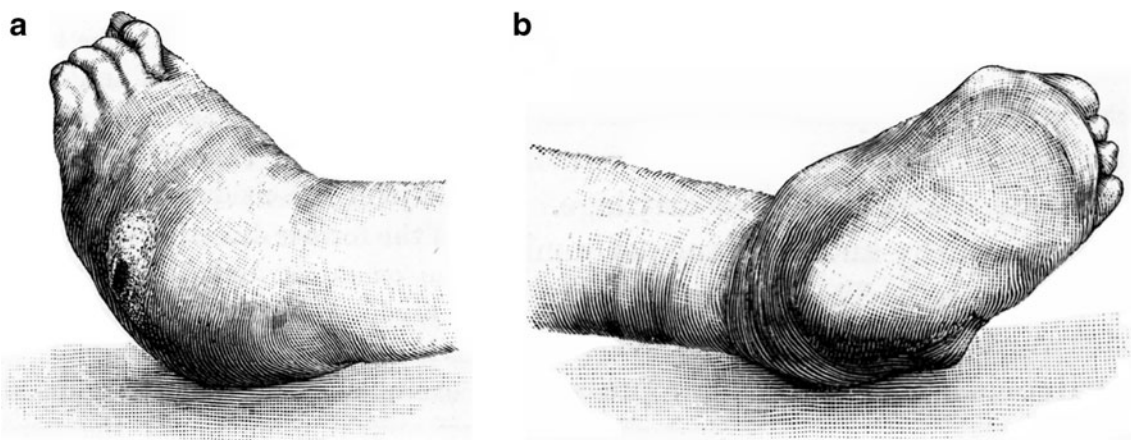


Fig. 2 (a) Lateral view of the left foot in a patient with tabetic arthropathy of the ankle, subtalar, talonavicular and calcaneonavicular articulations. An ulcer is present on the lateral border of the foot. (b) The foot

is displaced directly inwards and rotated on the long axis of the leg, so that the sole is directed medially and upwards [18]. Reproduced courtesy of the New York Academy of Medicine Library

Articulaires du Pied chez les Tabétiques (pied tabétique)' [1], was published in November of the same year in the *Archives de Neurologie*. Our translation of the introduction to this paper begins, 'Described for the first time, by one of us, the bone and joint conditions of the ataxic are well recognised today, at least their general features, when located on the long bones of the limbs and their large joints', and the authors went on to cite a recent report by Albert Pitres and Louis Vaillard, in which the hand was involved. However, they also state 'Similar changes corresponding to the short bones and small joints of the foot have not yet been discussed. It is to a group of cases of this type that we wish to call attention.' At this point, they make no reference to Page or his presentation 2 years earlier, or to the much more recent report of his second case [13, 15].

Charcot and Féré presented five 'Observations', consisting of four clinical cases of *tabes dorsalis* with foot deformities and the results of examination of the skeleton of an affected foot. They state with precision that their first case, Observation I, was seen by them on 30 April 1881. In the discussion of this case, Charcot and Féré briefly mention that, at the London Congress, Page had presented an ataxic patient with a foot deformity that was similar. They mention that Page had linked this condition without hesitation to the group of tabetic arthropathies described by Charcot in 1868. Their second case, Observation II, was Page's case, published in the 'Transactions of the 1881 International Medical Congress' [10]. The case was translated from English nearly verbatim, H. W. Page's name appears below the title of Observation II as 'A.-W. Page'. It is notable that the date of onset of Observation II is given as 'octobre dernier' (last October), meaning October 1880. Regardless of the date claimed for the first observation of the tabetic foot, by either J.-M. Charcot or H. W. Page—there is no archival confirmation of the date—H. W. Page was the first to report a case of tabetic arthropathy in which the bones of the foot were involved [9].

In their paper, Charcot and Féré attributed two footnotes to Page. The first reference pertains to his case presentation in the *Transactions of the International Medical Congress*, London, 1881 [10]. The second refers to the *British Medical Journal*, April 1824 [sic], page 772. The correct year of the publication was actually 1883 [13]. It is clear that the authors were familiar with Page's published reports on tabetic arthropathy of the foot and ankle.

Conclusion

There is no denying the deserved eminence of Jean-Martin Charcot and the meticulous clinical and pathological studies that led to his description of the arthropathies associated with *tabes dorsalis*, to which Herbert W. Page made due reference in his presentation to the International Congress in 1881. The claim in Charcot and Féré's November 1883 paper 'et il n'a

point encore été question, que nous sachions, d'altérations analogues portant sur les os courts et les petites articulations du pied' ('as far as we know, similar alterations in the short bones and small joints of the foot have not yet been discussed'), we know was not true. The fact that the original description was that of Page was noted by James Henry Targett in 1897 but has long since been forgotten [18]. This later paper also included clear drawings of a rather typical neuropathic deformity of the foot and ankle (Fig. 2). The illustrations accurately depict what we know of today as the Charcot foot with its associated deformity and ulceration. Herbert William Page stressed that these cases must be recognised and recorded. The practical importance of this recognition is prevention of amputation [12, 13].

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