

Reply

Response to the Role of Neuropathy on Fracture Healing in Charcot Neuro-Osteoarthropathy

We thank Professor Chantelau for his interest and letter. We agree that Charcot patients do not have a normal physiological response to fractures. Chantelau, asserts that this is because there is a continued weight bearing and traumatisation with decreased protective sensation allowing repetitive trauma to result in disorganisation of the foot. Chantelau argues that if this traumatisation is removed or prevented bone resorption and inflammation invariably stop.

There are several criticisms of this argument especially when one considers the onset and resolution of the inflammatory response that is characteristic of Charcot neuro-osteoarthropathy. We have noted that there is often a rapid onset of the Charcot foot which is characterised by a massive local inflammatory response even when the X-ray is still normal. Charcot himself emphasised the rapid onset of this condition in *tabes dorsalis* by describing the clinical manifestation as follows: “*There is a sudden onset of general tumefaction of the limb; rapid changes in the articular surfaces of the joint which manifest themselves as crepitations that are often noticed a few days after the onset*”². Very importantly, he noted that the bone and joint changes preceded the characteristic motor incoordination of locomotor ataxia and as such traumatisation: “*These arthropathies develop without apparent cause; they do not result exclusively, from the distension undergone by the ligaments and capsules of the joints or from the awkward gaits characteristic of ataxic patients*”². Charcot also noticed that this condition also occurred in patients lying in bed who have not been weight bearing³. Although trauma may be an important precipitating factor in the development of a Charcot foot, currently around two thirds of patients do not remember having injured their foot⁴.

However, we accept that if the foot is rested, there is a reduction in the inflammatory response but not always and not completely. Charcot patients need many months of casting before there is a significant reduction in skin temperature implying an ongoing inflammatory response not exclusively prolonged by trauma⁵.

The crucial question is this: does such an extreme rapid inflammatory response develop simply because the patient does not rest the foot as he lacks protective pain or does trauma to bone and joint in the presence of a specific peripheral neuropathy lead to an uncontrolled cytokine response resulting in inflammation and osteoclast activation and then overwhelming bone and joint destruction? The discovery of the cholinergic anti-inflammatory pathway by Tracey and co-workers and its possible impairment in diabetic neuropathy as discussed in our article indicates a putative mechanism for an uncontrolled cytokine response⁶.

In conclusion, we accept that the pathogenesis of the Charcot foot is not fully understood and perhaps we should leave the last word to Charcot: “*Let us keep looking, in spite of everything. Let us keep searching. It is indeed the best method for finding, and perhaps, thanks to our efforts, the verdict we will give our patients tomorrow will not be the same as we must give them today*”⁷.

Guillaume Mabilieu

Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Science
University of Oxford
Windmill Road, OX3 7LD Oxford, United Kingdom
guillaume.mabilieu@ndorms.ox.ac.uk

Michael E. Edmonds

Diabetic Foot Clinic
King's College Hospital
Denmark Hill, SE5 9RS London, United Kingdom
Michael.Edmonds@kch.nhs.uk

References

1. Petrova NL, Moniz C, Elias DA, Buxton-Thomas M, Bates M and Edmonds ME. Is there a systemic inflammatory response in the acute charcot foot? *Diabetes Care* 2007;30:997-8.
2. Sanders LJ. Jean-Martin Charcot (1825-1893). The man behind the joint disease. *J Am Podiatr Med Assoc* 2002; 92:375-80.
3. Charcot J. Sur quelques arthropathies qui paraissent dependre d'une lesion du cerveau ou de la moelle epiniere. *Arch Physiol Norm et Pathol* 1868;1:161-78.
4. Shaw J and Boulton AJ. The Charcot foot. *Foot* 1995; 5:65-70.
5. Petrova NL and Edmonds ME. Charcot neuro-osteoarthropathy-current standards. *Diabetes Metab Res Rev* 2008;24(Suppl.1):S58-61.
6. Tracey KJ. The inflammatory reflex. *Nature* 2002; 420:853-9.
7. Charcot J. Lecons du Mardi : Polycliniques. Paris: Bureau du Progres Medical (lesson of February 28, 1888, no page numbers). In: Goetz C, editors. Charcot the clinician: The Tuesday Lessons. New York: Raven Press; 1987. p. 164-186.