

## Letter to the Editor

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### Reply to letter from Dr Silver

We thank Dr Silver for his useful comments, which point out once more the importance of clinical observation in the development of adequate treatment strategies.

Untill now, clinical examination plays a vital role in the diagnosis of neurogenic heterotopic ossification (NHO), taking into consideration both clinical signs and likelihood. Since the pathophysiology of NHO is poorly understood and treatment options are scarce, its prevention is important and, thus, the early identification and adequate treatment of putative risk factors. In this perspective, there is, as Dr Silver beautifully illustrates in his case reports, ample empirical evidence that regular and cautious mobilisation of the large peripheral joints should be recommended from day of the spinal cord injury (SCI) to keep the joint capsules supple and to maintain adequate muscle length.

Results from several case reports revealed that vigorous passive exercises<sup>1–3</sup> increased the incidence of NHO, but also that a longer time interval between the injury and the beginning of well-dosed passive movement exercises enhances the risk of developing NHO.<sup>1,4–6</sup> These results were later supported by animal studies.<sup>7–9</sup> Moreover, through biological, biochemical, and biomechanical research more insight into the pathophysiology of NHO is obtained and it is now generally accepted that (micro)trauma and mechanical stress to the musculotendinous apparatus may arise either from vigorous passive exercises or from loss of mobility and muscle imbalance causing peak pressure on soft tissue areas.<sup>1–3,10–12</sup> Mechanical stress causes local microtrauma that may induce ossification either indirectly through an inflammatory response or directly by releasing osteoblast-stimulating factors. This insight takes into account the highly ‘vascular’ state of the paralysed area and the high likelihood of concomitant use of anti-coagulants which may predispose to haematoma and secondary NHO, particularly during the rehabilitation phase after SCI.<sup>13</sup> It is therefore, tempting to speculate that (forced) passive movements following a period of immobilisation may easily result in shear and tear of soft tissues leading to an increased risk of developing NHO.<sup>14,15</sup>

It is now generally incorporated in the treatment programmes for SCI patients that they should receive early, regular and cautious joint mobilisation to prevent that more rigorous exercises with the high risk of (micro)trauma to the periarticular tissues are ever necessary. This insight, as Dr Silver points out, primarily

developed based on clinical observation and was later supported by biological, biomechanical and biochemical research. Hence, it seems warranted to value clinical observations especially in a field where pathophysiological and epidemiological knowledge is still limited.

AA van Kuijk<sup>1</sup>, ACH Geurts<sup>1</sup> and HJM van Kuppevelt<sup>1</sup>  
<sup>1</sup>Department of Rehabilitation Medicine  
University Medical Centre, St Radboud  
Huipost 720, PO Box 9101, 6500 HB Nijmegen  
Netherlands

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