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Authors' reply:

Dear Editor,

We are grateful for Mr Inman's account of his unique experience, initially as a medically qualified patient and later as a consultant surgeon in the field of spinal injuries. In this latter role, he observed the outcomes of both systems of spinal cord injury care (Stoke Mandeville System, SMS, and the Spinal Cord Injury Model Systems, SCIMS).

Mr Inman emphasises the universal desire of patients to walk again following injury. Walking, even with an imperfect gait, allows access to many important activities of daily living. Mr Inman's experience is that patients who give informed consent to surgery believe it will lead to neurological improvement – hopefully, they will walk again - and they are often disappointed; SCIMS care results in worse outcomes than SMS care.¹

In any individual case of spinal cord injury, it is not usually possible, working retrospectively, often with incomplete data, to pinpoint which of many possible factors has led to a less favourable neurological outcome. However, surgery and its associated anaesthesia – surgery is emphasised in SCIMS - always carries the risks described in detail by Mr Inman. Use of the SCIMS system of rapid mobilisation before the return of autonomic and spinal reflexes introduces many more potential risks. The incidence of neurological deterioration is well documented during monitored mobilisation.² Immediate return to recumbency is needed to recover neurological loss and prevent further deterioration. The pathophysiological mechanisms of such deterioration, as well as a range of other complications, are well documented.³

The Stoke Mandeville system prevents further mechanical and non-mechanical damage to the vulnerable and unstable spinal cord. This is achieved by Active Physiological Conservative Management (APCM) of the injured bony spine and management of the systemic effects of neurological damage from the earliest possible moment after injury. Its priority is to maximise the natural neurological recovery of the spinal cord, and the safe and socially convenient functioning of each body system affected by the impaired neurology.

Bony instability and cord compression are treated surgically only when strictly necessary. This protects the physiologically unstable and vulnerable neural tissues from further mechanical and non-

mechanical damage during surgery and anaesthesia. APCM helps prevent systemic complications that can further damage the neural tissues but also prevents local complications that can impede successful rehabilitation of the locomotor and other systems of the body. It ensures all affected body systems are optimised to maximise independence. The rationale and outcomes of this care system have been well documented.²⁻⁸

Mr Inman describes his own neurological progress. This took place without surgical intervention. After a cervical fracture, he improved from Frankel B (complete motor loss but some retained sensation) to being able to walk unsupported, an outcome maintained for almost four decades. Such a recovery is no surprise. It is the neurological outcome achieved by most similar patients receiving SMS care⁹ and achieved consistently by three generations of physicians and surgeons who managed patients in line with the SMS.

SCIMS care was adopted without evidence that it yielded outcomes as good or better than SMS care. The development of CT and MRI encouraged clinicians to adopt surgical interventions. Logically, it was assumed that surgical stabilisation would better protect spinal neural tissue, ease the burden on nursing staff, enable earlier mobilisation and faster rehabilitation, shorten the period of hospitalisation, and reduce costs of treatment for medical insurers.

There were no studies to show that the assumed benefits of surgical stabilisation and early mobilisation were achieved. Similarly, surgical decompression was simply assumed to improve recovery, and the effects of surgical decompression on the perfusion pressure of the spinal cord do not seem to have been considered.^{5,10} To this day, there is no evidence that surgery delivers the same benefits as APCM.

Administrative pressure for early discharge was another factor leading to SMS being abandoned in favour of SCIMS. Hospital managers and medical insurers failed to establish evidence that equal or better outcomes were being achieved.

Although we have shown the superiority of neuro-functional outcomes of SMS over SCIMS care,¹ it would be helpful to understand other outcomes through studies on the treatment of the injured spine that simultaneously examine all clinical outcomes (including pain, spinal mobility, etc) and the comparative costs of the different systems. The data required include:

- Surgical data: pre- and postoperative neurological examinations; neurological findings before, during, and after mobilisation; the incidence of local and systemic complications that can further damage neural tissues.
- Intensive care data: incidence, duration, and costs of intensive care admissions for monitoring and treatment.
- Invasive ventilation: incidence, duration, and cost.
- Body system complications: incidence, duration, and costs of systemic complications that can further damage neural tissues.
- Bed rest: duration and costs of continuous and intermittent care.
- Local complications: incidence and cost of treatment.
- Mobilisation: interval between injury and mobilisation; outcome of monitoring (neurology, blood pressure, vital capacity, oximetry) during mobilisation; best practice requires comprehensive neurological documentation before and after each stage of the mobilisation process.
- Costs at different stages of care: duration and cost of initial hospitalisation from admission to specified end points of rehabilitation; levels of independence and

neurological outcome on discharge; cost of support in the community during the first five years following discharge.

- Overall neurological outcomes: outcomes on admission and discharge documented with the Frankel classification, so that spinal centres can compare their results with one another and with historical data.
- Pain: incidence, intensity, duration, and cost of pain treatment, including costs after discharge.
- Spinal flexibility: residual range of movement of the spine, its effect on independence.
- Rehospitalisation: incidence, duration, and cost of rehospitalisation for complications during the first five years following discharge.
- Reintegration into the community: adequacy of social and vocational reintegration.

As Mr Inman points out, had he been offered SCIMS care rather than SMS care, and been asked to consent to surgery, though medically qualified he “would not have had the knowledge I now have to make a rational decision on this, even less so would a layperson.”

The superior neuro-functional outcomes of SMS care over SCIMS care are now established. We hope our findings will encourage clinicians to ensure their patients are fully informed regarding the different methods of treatment for the injured spine.

J. M. Graham, FFPH, PhD, BM BCh,
Trustee Spirit Spinal Injuries Charity,
Northampton, UK.
Principal Medical Officer (retired), Department of Health,
London, UK.

B. T. Graham, PhD, MMath (Oxon),
Mathematician,
London, UK.

W. S. El Masri, FRCS Ed, FRCP, PHF,
Hon. Clinical Professor of Spinal Injuries, Keele University,
Keele, UK.

Emeritus Consultant Surgeon in Spinal Injuries – Midland Centre for Spinal Injuries, The Robert Jones & Agnes Hunt Orthopaedic Hospital,
Oswestry, UK.

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Conflicts of Interest: None

AI: AI technology was not used to create any part of this letter.