Spinal immobilisation in emergency and pre-hospital care: a systematic review of the literature

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Background: Spinal immobilisation has been a mainstay of trauma care for decades and is based on the premise that immobilisation will prevent further neurological compromise in patients with a spinal column injury. The two most dominant decision support rules used in determining the need for cervical spine immobilisation are the NEXUS criteria from the National Emergency X-Radiography Utilization Study and Canadian C-Spine rules.[1,2] It should be noted however, that both of these decision support tools aim to guide decisions regarding cervical spine imaging, and their results have been extrapolated to guide decisions regarding cervical spine immobilisation.
Aim: The aim of this systematic review was to examine the evidence related to spinal immobilisation in pre-hospital and emergency care settings.
Method: In February 2015, we performed a systematic literature review of English language publications from 1966 to February 2015 indexed in MEDLINE and Cochrane library using the following search terms: 'spinal injuries' OR 'spinal cord injuries' AND 'emergency treatment' OR 'emergency care' OR 'first aid' AND immobilisation. EMBASE was searched for keywords 'spinal injury OR 'spinal cord injury' OR 'spine fracture AND 'emergency care' OR 'prehospital care'.
Results:[3] There were 47 studies meeting inclusion criteria for further review. Ten studies were case series (level of evidence IV) and there were 37 studies from which data were extrapolated from healthy volunteers, cadavers or multiple trauma patients. There were 15 studies that were supportive, 13 studies that were neutral, and 19 studies opposing spinal immobilisation. The specific outcomes of interest were:

- Neurological outcome: 8 studies – 1 opposing and 7 neutral for spinal immobilisation
- Preventing movement: 16 studies – 10 supportive, 5 neutral, and 1 opposing spinal immobilisation
- Spinal alignment: 5 studies – all supportive of spinal immobilisation
- Improving comfort or decreasing pain: 5 studies – all opposing spinal immobilisation
- Causing complications (increased intracranial pressure, pressure injuries, respiratory compromise): 13 studies – 1 neutral and 12 opposing spinal immobilisation

Conclusion: There are no published high-level studies that assess the efficacy of spinal immobilisation in pre-hospital and emergency care settings. Almost all of the current evidence is related to spinal immobilisation is extrapolated data, mostly from healthy volunteers. There were no studies that showed spinal immobilisation improved neurological outcomes. Based on the current evidence it appears immobilisation does prevent movement but the clinical significance of movement prevention is unknown. Spinal immobilisation has a high risk of complications and cervical collars may mask other injuries and delay diagnosis and definitive care. Protocols that recommend application of spinal immobilisation should consider the risk versus benefits.

References

1. Hoffman JR, Mower WR, Wolfson AB, Todd KH, Zucker MI. Validity of a set of clinical criteria to rule out injury to the cervical spine in patients with blunt trauma. *New Eng J Med* 2000; 343: 94-9.
2. Stiell IG, Wells GA, Vandemheen KL, Clement CM, Lesiuk H, De Maio VJ, Laupacis A, Schull M, McKnight RD, Verbeek R. The Canadian C-spine rule for radiography in alert and stable trauma patients. *J Am Med Assoc* 2001; 286: 1841-8.
3. Hood N, Considine J. Spinal immobilisaton in pre-hospital and emergency care: a systematic review of the literature. *Australas Emerg Nurs J* in press: accepted 22/03/2015.