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SPECIAL CONTRIBUTION

SPINAL MOTION RESTRICTION IN THE TRAUMA PATIENT – A JOINT POSITION STATEMENT

Peter E. Fischer, MD, MS, Debra G. Perina, MD, Theodore R. Delbridge, MD, MPH, Mary E. Fallat, MD, Jeffrey P. Salomone, MD, Jimm Dodd, MS, MA, Eileen M. Bulger, MD, Mark L. Gestring, MD

ABSTRACT

The American College of Surgeons Committee on Trauma (ACS-COT), American College of Emergency Physicians (ACEP), and the National Association of EMS Physicians (NAEMSP) have previously offered varied guidance on the role of backboards and spinal immobilization in out-of-hospital situations. This updated consensus statement on spinal motion restriction in the trauma patient represents the collective positions of the ACS-COT, ACEP and NAEMSP. It has further been formally endorsed by a number of national stakeholder organizations. This updated uniform guidance is intended for use by emergency medical services (EMS) personnel, EMS medical directors, emergency physicians, trauma surgeons, and nurses as they strive to improve the care of trauma victims within their respective domains.

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INTRODUCTION

The American College of Surgeons Committee on Trauma (ACS-COT), American College of Emergency Physicians (ACEP), and the National Association of EMS Physicians (NAEMSP) have previously offered varied guidance on the role of backboards and spinal immobilization in out-of-hospital situations (1, 2). This updated uniform guidance is

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Acknowledgments: This consensus statement represents the collective positions of the American College of Surgeons – Committee on Trauma (ACS-COT), the American College of Emergency Physicians (ACEP), and the National Association of EMS Physicians (NAEMSP). It was developed to offer guidance on the topic of spinal motion restriction (SMR) in the trauma patient.

Endorsements: This consensus statement was reviewed and formally endorsed by the following organizations: The American Association for the Surgery of Trauma (AAST); The Eastern Association for the Surgery of Trauma (EAST); The Western Trauma Association (WTA); The National Association for State EMS Officials (NASEMSO); The National Association of Emergency Medical Technicians (NAEMT); Emergency Medical Services for Children Innovation and Improvement Center; The Pediatric Trauma Society (PTS); The National Association of EMS Educators (NAEMSE); The American Pediatric Surgical Association (APSA); The Society of Trauma Nurses (STN); The American Academy of Pediatrics (AAP); The Emergency Nurses Association (ENA).

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intended for use by emergency medical services (EMS) personnel, EMS medical directors, emergency physicians, and trauma surgeons as they strive to improve the care of trauma victims within their respective domains. This document is not meant to be a complete review of all publications on this topic, but rather a consensus statement based on the combination of available peer-reviewed, published evidence and expert opinion.

POINTS OF CONSENSUS

1. Unstable spinal column injuries can progress to severe neurological injuries in the presence of excessive movement of the injured spine.
2. While current techniques limit or reduce undesired motion of the spine, they do not provide true spinal immobilization. For this reason, the term "spinal motion restriction (SMR)" has gained favor over "spinal immobilization," although both terms refer to the same concept. The goal of both SMR and spinal immobilization in the trauma patient is to minimize unwanted movement of the potentially injured spine.
3. While backboards have historically been used to attempt spinal immobilization, SMR may also be achieved by use of a scoop stretcher, vacuum splint, ambulance cot, or other similar device to which a patient is safely secured.
4. Indications for SMR following blunt trauma include:
   i. Acutely altered level of consciousness (e.g., GCS <15, evidence of intoxication)
   ii. Midline neck or back pain and/or tenderness
   iii. Focal neurologic signs and/or symptoms (e.g., numbness or motor weakness)
   iv. Anatomic deformity of the spine
   v. Distracting circumstances or injury (e.g., long bone fracture, degloving, or crush injuries, large burns, emotional distress, communication barrier, etc.) or any similar injury that impairs the patient's ability to contribute to a reliable examination
5. SMR, when indicated, should apply to the entire spine due to the risk of noncontiguous injuries (3). An appropriately-sized cervical collar is a critical component of SMR and should be used to limit movement of the cervical spine whenever SMR is employed. The remainder of the spine should be stabilized by keeping the head, neck, and torso in alignment. This can be accomplished by placing the patient on a long backboard, a scoop stretcher, a vacuum mattress, or an ambulance cot. If elevation of the head is required, the device used to stabilize the spine should be elevated at the head while maintaining alignment of the neck and torso. SMR cannot be properly performed with a patient in a sitting position.
6. All patient transfers create potential for unwanted displacement of an unstable spine injury. Particular attention should be focused on patient transfers from one surface to another including, for example, ground to ambulance cot. A long spine board, a scoop stretcher, or a vacuum mattress is recommended to assist with patient transfers in order to minimize flexion, extension, or rotation of the possibly injured spine.
7. Once a patient is safely positioned on an ambulance cot, transfer or extrication devices may be removed if an adequate number of trained personnel are present to minimize unnecessary movement during the removal process. The risks of patient manipulation must be weighed against the benefits of device removal. If transport time is expected to be short, it may be better to transport a patient on the device and remove it on arrival at the hospital. If the decision is made to remove the extrication device in the field, SMR should be maintained by assuring that the patient remains securely positioned on the ambulance cot with a cervical collar in place.
8. Hospitals should be prepared and equipped to carefully and quickly remove patients from a long backboard, scoop stretcher, or vacuum mattress as soon as possible after arrival at the hospital. Safe transfer may require the use of a slider board or similar device in order to maintain SMR during patient movement. Procedures should be in place to assure that a sufficient number of properly trained individuals are available to assist with patient transfers in order to minimize the risk of inadvertent displacement of a potentially unstable spinal injury.
9. There is no role for SMR in penetrating trauma (4, 5).
10. SMR in Children
    i. Age alone should not be a factor in decision-making for prehospital spinal care, both for the young child and the child who can reliably provide a history (6, 7).
    ii. Young children pose communication barriers, but this should not mandate SMR purely based on age (6, 7).
    iii. Based on the best available pediatric evidence from studies that have been conducted through the Pediatric Emergency Care Applied Research Network (PECARN), a cervical collar should be applied if the patient has any of the following (8–10):
        a. Complaint of neck pain;
        b. Torticollis;
        c. Neurologic deficit;
        d. Altered mental status including GCS <15, intoxication, and other signs (agitation, apnea, hypopnea, somnolence, etc.)

e. Involvement in a high-risk motor vehicle collision, high impact diving injury, or has substantial torso injury.

iv. There is no evidence supporting a high risk/incidence for noncontiguous multilevel spinal injury in children. The rate of contiguous multilevel injury in children is extremely low at 1%. The rate of noncontiguous multilevel injury in children is thought to be equally as low (10).

v. Minimize the time on backboards with consideration for use of a vacuum mattress or padding as adjuncts to minimize the risk of pain and pressure ulcers if this time is to be prolonged.

vi. Because of the variation in the head size to body ratio in young children relative to adults, additional padding under the shoulders is often necessary to avoid excessive cervical spine flexion with SMR.

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