Position Statement for the Management of Patients with Potential Spinal Injuries

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Purpose:
Field spinal immobilization has long been standard practice for movement of the patient with potential spinal compromise from the point of injury to the Trauma center. The long spineboard with a rigid cervical collar have been the central component of spinal motion restriction. This practice has persisted despite evidence to the benefit of the long spineboard. Recent literature, and a joint position statement published by the American College of Surgeons Committee on trauma, and the National Association of EMS Physicians have called into question this practice. Research based out of the Southwest Texas Regional Advisory Council has demonstrated superior methods of transport to promote spinal stabilization.

Scope:
The San Antonio Fire Department Emergency Medical Services has adopted new protocols that requires immediate spinal motion restriction for any patient suffering from high energy impacts such as motor vehicle crashes, auto-pedestrian incidents, industrial accidents, or falls.
The long spine board SHOULD NOT be considered the primary mechanism for spinal motion restriction.

Background:
Since J.D. Farrington first formally described the long spine board (LSB) in “Death in a Ditch” [1], emergency medical services (EMS) providers have used this medical device during extrication and transport of trauma patients. The immobilization process is intended to hold the head in line with the torso to prevent secondary injury to the neurotissue protected by the spinal column. Secondary injury holds the potential to result in devastating morbidity with a significant risk of mortality. Because of the gravity
of these complications, historically, EMS providers have used a LSB on any patient with suspected cervical spine injury, a "conservative" treatment that results in significant overtriage [2].

Use of the LSB followed a practical and theoretical approach to spinal motion restriction, yet there is a paucity of data documenting the efficacy of this procedure. Proving efficacy is a key question because the LSB is not a benign medical device. Complications resulting from the use of the LSB include the following: pain [3], increased anxiety following a traumatic event, cutaneous pressure ulceration after use [4], elevated intracranial pressure [5], and increased difficulty in airway management [6]. In addition, use of the LSB may lead to unnecessary diagnostic radiologic testing due to difficulty in distinguishing if pain is resulting from the traumatic injury or from being secured [7] to the LSB [8].

Respiratory compromise is also Studies of healthy, nonsmoking males showed that spinal motion restriction may lower a patient's forced vital capacity (FVC), forced expiratory volume over 1 second (FEV1), and forced mid-expiratory flow (FEF 25–75%). Spinal motion restriction may be accomplished using a variety of techniques. Current evidence indicates that securing a patient to the soft mattress of a stretcher using a rigid cervical collar, foam head blocks with tape and safety belts should provide adequate motion restriction [9,10]. If there is also concern for any brain trauma, the head of the stretcher should be elevated to approximately 30 degrees unless there are suspicions for thoracic or lumbar spinal cord injury.

The complications and perhaps efficacy of the LSB lies in its design. Essentially, it is a smooth, hard flat surface. Patients requiring a protracted transport, or interfacility transport, may be exposed to the LSB for a considerable time. Increasing the time that a patient is secured to the LSB thus affects the risk-benefit consideration. Modern ambulance stretchers have a padded mattress that conforms to a patient's anatomy. In combination with a cervical collar, the stretcher mattress essentially becomes a flat surface to secure the patient, and with a conforming fit and nonslick surface, patient movement may be reduced without many of the complications of the LSB, but this has not been proven. To date, there have been no randomized controlled trials of spinal immobilization strategies for the transport of spinal trauma patients [11].

**Medical Guidance:**

**Patients SHOULD NOT be transported on a long spine board, with rare exception.** Long Spine Backboards and scoop stretchers shall be used for extrication, movement or if provider feels backboard or scoop stretcher will facilitate patient care.

The primary technique for spinal motion restriction shall consist of:

- Manual stabilization of the neck and back to prevent movement
- Placement of a rigid cervical collar, properly fitted
- Move to the ambulance stretcher (may use backboard, scoop or slide board)
- Ambulatory patients may be allowed to sit and be gently lowered while being supported thus maintaining neutral spinal alignment
- Head of the bed elevated to 30 degrees (may be lower if painful)
- Prevent movement of the head with lightweight foam head blocks
• Tape head and blocks in place to stretcher
• Stretcher seatbelts should be used at chest (with shoulder harness), waist and knee levels.
• At the receiving facility, move patient from stretcher with manual stabilization of neck and back using slide method

Motor vehicle collision victims who are ambulatory or able to self-extricate without causing undue pain should be encouraged to move themselves to a supine position on the EMS stretcher, after application of a cervical collar

The patient unable to ambulate should be moved off the long spine board or scoop stretcher and placed on the ambulance stretcher mattress. The only time a patient should be transported on a long spine board is if removal of the board will significantly interfere with patient management.

**INDICATIONS for Spinal Motion Restriction include:**

- Fall or Blunt trauma with altered level of consciousness
- Spinal pain or tenderness
- Neurologic complaint (e.g., numbness or motor weakness)
- Anatomic deformity of the spine
- High-energy mechanism of injury and any of the following:
  - Drug or alcohol intoxication
  - Inability to communicate
  - Distracting injury
  - Cervical Axial Load injury such as diving accident or significant fall with head first contact.

Many patients with minor trauma do not need spinal motion restriction. The risks of spinal motion restriction include: increased pain, patient agitation, increased work of breathing, increased exposure to x-ray testing, and skin injury.

**CONTRAINDICATIONS for Spinal Motion Restriction include:**

Immediate transport is the priority for patients suffering from penetrating trauma. Spinal motion restriction takes additional time, and has demonstrated worse outcome with penetrating trauma [9]. **Spinal precautions during transport of patients penetrating trauma is not recommended.**

Spinal motion restriction is NOT INDICATED in blunt trauma patients who meet all of the following criteria:

1. Normal level of consciousness (Glasgow Coma Score [GCS] 15)
2. Able to communicate with providers (age 2 yrs. and up)
3. No significant distracting injury such as long bone fracture or burns
4. No drug or alcohol intoxication
5. No abnormal neurologic findings or complaints
6. No spine tenderness or anatomic abnormality on exam  
7. No neck pain with axial load to top of head  
8. No Pain with patient initiated rotation or flexion-extension of neck  

**Additional Considerations:**

If spinal pain prevents the patient from moving to a neutral inline position, then spinal motion restriction should be performed in the position found.

If a patient requires intubation, spinal motion restriction should be maintained by a team member holding the head in neutral position throughout the intubation procedure. The cervical collar can be (re)applied to the patient post intubation.

As with all medical procedures, patients may refuse any or all parts of immobilization. Standard processes should be utilized to validate decision-making capacity and comprehension of risk and benefit to all medical procedures. Documentation of decision-making capacity and understanding of risks must be included in the PCR.

**Challenges:**

Transition of patients from the EMS Stretcher to the hospital bed or surgical/CT scanner table has not been tested. Research is currently underway to validate best practices.

Current recommendations for transition is to untape the head and maintain manual stabilization of the cervical spine, having three attendants on each side of the patient positioned at the chest, abdomen/pelvis, and one at the lower extremities. The stretcher mattress sheet may be used alone, or with a hospital slide board (preferred).

**Conclusion**

Blunt trauma patients with suspicion of spinal injury should be immobilized to the EMS stretcher with rigid cervical collar and head of bed elevated at 30 degrees. Penetrating trauma patients with no spinal involvement should not be immobilized. The LSB should be used for extrication purposes only, and not used during transport.

**References:**


