



POLICY T1 – SPINAL MOTION RESTRICTION

Effective Date: January 16, 2017
Last Review Date: January 1, 2017 – New Policy
Next Review Date: January 2019

Purpose:

To protect patients exhibiting signs and symptoms of spinal injuries and those who have the potential for spinal injuries.

Introduction: The term “Spinal Motion Restriction” best describes the procedure used to care for patients with possible spinal injuries. This includes A) Reduction of gross motor movement by the patient, B) Prevention of duplicating the damaging mechanism to the spine, and C) Regular reassessment of the motor, vascular, and sensory functions.

This protocol has not been composed to “clear” patients who may or may not have spinal injuries in the field. This policy seeks to provide an evidence-based approach (whenever possible) that directs the careful practice of Spinal Motion Restriction through set criteria. This may include modified positioning for patients that have experienced traumatic injuries.

Place these patients in Spinal Motion Restriction when the benefits outweigh the risks. When the benefits do not outweigh the risks, patients should not incur clinically unnecessary immobilization with hard collars and back boards based on tradition alone. The need for and degree of restriction or immobilization of the neck and spine should be assessed in every patient with any degree of traumatic injury.

The utilization of back boards/long spine boards should be for patient movement to the stretcher and for those patients who exhibit signs and symptoms of spinal injury.

Maintenance of in-line spinal alignment when moving the patient and appropriately securing them to the transport stretcher remains an important component of Spinal Motion Restriction.

Spinal Injury Assessment:

If a spinal injury is suspected (to the spinal cord or spinal column) use the following in assessing the patient.

1. **Language Barrier:** The inability to communicate through a language the provider and patient have in common. Using family members or bystanders (third party translators) to obtain assessment findings is not an ideal situation although acceptable. It is preferred when possible to use certified translators.
2. **Age Extremes:** Are defined as patients 7 years of age or younger and the “elderly.” Patients in these age demographics can be prone to unreliable medical history or communicating the events leading to the injury. If these patients have suffered a mechanism of injury compatible with possible spinal injury, they should be placed in Spinal Motion Restriction. Always use extra padding in the pediatric and geriatric populations. People are considered elderly if they have anatomic and/or physiologic degradations from normal baseline.
3. **Altered Mentation:** Any patient that is unable to appropriately answer questions used to determine the level of orientation. The use of Glasgow Coma Scale (GCS) and AVPU (Alert, Verbal, Purposeful, and Unresponsive) should not be the only method used. This is regardless of past medical

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history/condition(s) where altered mentation may be a baseline to the patient. In addition, any patient that cannot remember the events leading to the injury or a reported loss of consciousness should be placed in Spinal Motion Restriction. Remember that patients with head/brain injuries and acute stress reactions are considered unreliable in their examination.

4. **Alcohol and/or Drug Ingestion:** Any patient suspected to have used alcohol and/or drugs (e.g. narcotics, benzodiazepines, barbiturates, marijuana, and cocaine) should be considered at high risk for the potential of spinal injury with the appropriate mechanism. The provider's impression of clinical sobriety (use caution) can help guide whether the patient will be placed in Spinal Motion Restriction if they have suffered a mechanism of injury compatible with a possible spinal injury. Clinical sobriety is based upon the provider's judgement. There is no hard rule for what constitutes clinical sobriety. If there are questions or concerns the provider needs to contact the base hospital and/or their supervisor for guidance. Are there signs of impairment that limits the patient's capacity to make decisions and give a proper examination?
5. **Neck, Spine, or Paraspinal Pain or Tenderness:** Any patient presenting with pain or palpable tenderness in the spinal area from the base of the skull to the coccyx or paraspinal (adjacent to the spinal column) areas after suffering a mechanism of injury compatible with possible spinal injury, are to be placed in Spinal Motion Restriction. Don't force non-cooperative or combative patients into Spinal Motion Restriction or traditional spinal immobilization.
6. **Spinal Deformities on Exam:** When a deformity is found in the spinal area from the base of the skull to the coccyx that could have resulted from the sustained traumatic event, patients are to be placed in Spinal Motion Restriction.
7. **Decreased Range of Motion/Sensation:** Any patient that present with gross motor deficits, decreased or lost range of motion, numbness or tingling to any of the extremities after suffering a mechanism of injury compatible with a possible spinal injury, are to be placed in Spinal Motion Restriction.
8. **Distracting Pain:** Any injury not related to the potential spinal trauma that causes the patient not to focus on the provider's examination and/or questioning. The provider must use their best judgment when an injury exists that is taking away from the examination of the spinal area.
9. **Trauma Criteria:** If a patient meets trauma triage criteria apply traditional spinal immobilization that includes hard backboard. Please ensure that appropriate cushioning and padding are placed. An example is the kyphotic elderly patient that unless modified the spinal immobilization can cause greater harm than good. If there is concern that traditional spinal immobilization will cause undue harm, then contact base hospital for advice regarding modification. Remember that SMR (Spinal Motion Restriction) does not equal Traditional Spinal Immobilization with LSB (Long Spine Board).

Spinal Examination Procedure:

1. This procedure details the spinal examination process and must be used in conjunction with the above Spinal Examination Assessment.
2. Spinal Motion Restriction does not take precedence over airway, respiratory, and cardiovascular stabilization of the critical trauma patient.
3. With the patient's spine supported to limit movement, begin palpation at the base of the skull (at the midline of the spine), and continue the palpation of the spinal column to include the sacrum (base of the spine). Palpate each individual vertebrae and the paraspinal musculature.
4. Provide an extrication or rigid cervical collar and continue to maintain neutral in-line immobilization (not traction).

5. Explain to the patient the actions you are going to take. Ask the patient to immediately report any pain, numbness, or other neurologic findings and answer the questions with a “yes” or “no” rather than shaking their head. Have the patient repeat back their understanding to avoid patient moving themselves.
6. Moving the head into a neutral in-line position is contraindicated if:
 - a. There is pain upon starting movement.
 - b. There is muscle spasm or back pressure upon attempting movement.
 - c. Patient holds head angulated (tilted) to the side and patient cannot move head.
 - d. The head is rigidly held to one side.
 - e. The maneuver cannot be safely achieved due to space or other consideration.
 - f. In these cases, the patient shall have Spinal Motion Restriction in the position in which they are found.
7. On palpation of each vertebral body, look for evidence of pain and ask the patient if they are experiencing pain. If evidence of pain along the spinal column is encountered, the patient should have their spinal motion restricted. This does not necessarily mean placing them on a long hard spine board. The patient can be placed/secured to the gurney and have a cervical collar applied. Reminding the patient to limit their movement.
8. Document motor, gross sensation, and circulation status on each of the extremities. This documentation includes the proximal and distal aspects of the extremities. This needs to be performed prior to, and a modified version after the patient is placed in spinal immobilization.

Pre-immobilization Motor Examination

- a. Check finger adduction and abduction in both hands.
- b. Check bilateral grip strength
- c. Check wrist extension and flexion in both hands.
- d. Check flexion and extension at both elbows.
- e. Check the ability to shrug both shoulders.
- f. Check plantarflexion in both feet.
- g. Check dorsiflexion in both feet.
- h. Check flexion and extension at both knees.
- i. Check flexion and extension at both hips.

Post-Immobilization Motor examination

You can eliminate d, h, and i – which are d) flexion and extension at the elbow, h) flexion and extension at the knees, and i) flexion and extension at the hips.

9. Check and document for abnormal sensations (e.g. paresthesia) in all extremities.

Spinal Motion Restriction Procedure:

- A. Provide manual stabilization restricting gross motion while avoiding traction being placed on the spine in any direction.
- B. Correctly size the rigid cervical collar to additionally avoid traction being placed on the spine. Apply cervical collar.
- C. Always ensure adequate padding and support for patients. This is especially true in the elderly and pediatric population. Abnormal flexion for the pediatric population can cause respiratory compromise.

- D. Extricate patient limiting flexion, extension and rotation of the spine.
- E. Obtain a baseline assessment of the patient's motor and sensory function prior to placement of Spinal Motion Restriction. The function of a long board/back board is for the transfer of patient from their vehicle or location to the EMS gurney/stretchers (except when they meet trauma triage criteria). The KED (Kendrick Extrication Device) can be used as appropriate if needed.
- F. Place patient on long board/back board. Whenever possible avoid rolling or "log rolling" the patient to the long board/back board. The patient should be "fork-lifted" to the extrication device and/or stretcher. Utilize multiple rescuers to maintain spinal column integrity of alignment. The patient should be placed on the board best suited to protect the airway. Pad any voids between the patient's body and long board/back board if needed (e.g. kyphotic patients and under pediatric patient's shoulder with large occiput).
- G. If needed the patient can be secured to the stretcher with the knees bent to decrease pressure and potential pain to the back/spine. There needs to be support behind the knees for this position. Complete a thorough physical evaluation and history prior to ensure there is no injury to the thoracic or lumbar spine. This needs to be documented in the Patient Care Record (PCR).
- H. Use straps, webbing, and another approved equipment to secure the patient.
- I. Obtain a second assessment of the patient's motor and sensory function after the patient has been secured to stretcher. Regularly reassess the patient's motor and sensory and respiratory quality throughout the duration of patient care if possible.
- J. If the capable patient is found to be pain free, ask the patient to turn their head first to one side (so that the chin is pointing toward the shoulder on the same side as the head is rotating) then, if pain free, to the other. If there is evidence of pain the patient should be placed in Spinal Motion Restriction.

Special Considerations

1. **Ambulatory patients at scene/Self-extricated:** Patients who are ambulatory at the scene of blunt trauma may not require either traditional spinal immobilization or Spinal Motion Restriction. They do need a full evaluation for spinal injury. The use of "standing takedown" is no longer recommended. If the examination indicates Spinal Motion Restriction, then act accordingly.
2. **Axial Loading Accidents:** An example of this mechanism is diving injury. These patients are at great risk for spinal injury.
3. **Penetrating Trauma:** Stabbings and gunshot wounds to the head, neck and/or torso SHOULD NOT receive traditional spinal immobilization unless there is one or more of the following:
 - a. **Obvious neurologic deficits to the extremities**
 - b. **Significant secondary blunt mechanism of injury** (e.g. fell down stairs after getting shot)
 - c. **Priapism**
 - d. **Anatomic deformity to the spine.**
4. **Patients with acute or chronic dyspnea/lung disease:** Traditional spinal immobilization has been found to limit respiratory function with the greatest effect on the geriatric and pediatric patients. If not monitored these patients can respiratory arrest.
5. **Modified Traditional Spinal Immobilization:** Any instance where placement or positioning of a patient on a spinal board becomes detrimental to the outcome of the patient's health or injury. Modified traditional spinal immobilization will consist of either a rigid cervical collar or object(s) (i.e. towels,

blankets, blocks) to maintain the integrity of the cervical spine followed by placement in a position better suited for management of the concerns that did not allow traditional spinal immobilization standards. Always ensure adequate padding to prevent skin breakdown (this can occur rapidly).

6. **Chronic versus New Onset Pain and/or Deficits:** Always err on the side of precaution when dealing with new or chronic pain and/or neurologic deficits. Use Spinal Motion Restriction and precautions such as cervical collar and immobilization on the stretcher (provider judgement).
7. **Isolated Cervical Pain:** If, after a complete physical evaluation and history, the sole finding and patient complaint is isolated cervical pain, the application of a cervical collar and alternative positioning on the stretcher may be considered. A complaint of isolated neck pain must include the following documentation points:
 - a. Absence of numbness, tingling or weakness
 - b. Absence of neurologic findings
 - c. Absence of distracting injuries
 - d. Patient safely secured/restrained to prevent injury
8. **Pregnancy:** These patients may need to be restrained on a hardboard allowing them to be placed in a left lateral position of at least 15 to 30 degrees. This will take the uterus off the inferior vena cava and improve the venous return.
9. **Pediatric Patients and Car Seats:**
 - a. Always inspect the posterior aspect of children in care seats. Infants restrained in a rear-facing car seat may be immobilized and extricated in the car seat if the immobilization is secure and his/her condition allows (no signs of respiratory distress or shock).
 - b. Children restrained in a car seat with a high back may be immobilized and extricated in the car seat; however once removed the child should be placed in spine motion restriction.
 - c. Children restrained in a booster seat (without a back) need to be extricated and immobilized following the Spinal Motion Restriction procedure after clinical examination.
 - d. Utilization of padded pediatric motion restricting boards, if available may be used for traditional pediatric spinal immobilization.
10. **Combative Patients:** Avoid methods that provoke increased spinal movement and/or combativeness. To prevent other potential damage let the patient position themselves.
11. **Diseases that increase Risk:** Patients that have osteoporosis, prior spinal fractures, arthritis, cancer, dialysis or underlying spinal or bone disease require the provider to be extra cautious. These patients are at higher risk for injury even in minor mechanisms secondary to their illness. Occasionally in patients who are extremely kyphotic the provider may need to be creative to immobilize these patients. In kyphotic patients if great care is not taken to carefully immobilize these patients great harm can occur to these patients.
12. **Alternative Devices:** The use of vacuum mattresses and/or other approved appropriate devices can be utilized.
13. **“Change of plane fall”:** This is defined as when a patient strikes his head while falling, causing sudden deceleration and hyperextension of the cervical spine. Take extra caution with these patients during the evaluation.
14. **Spinal Immobilization While Transporting:** If a patient that was deemed safe for transport without Spinal Motion Restriction per this policy develops spinal/paraspinal pain with neurological deficits during transport, the provider must use their best judgment factoring the severity, transport route and time left in transport. If stopping transport to provide Spinal Motion Restriction or traditional spinal

immobilization would be detrimental to the patient's outcome, the ambulance should proceed to the ED. If the provider determines that Spinal Motion Restriction or traditional spinal immobilization would benefit the patient's outcome and it can be safely completed, the ambulance may pull over and complete the procedure then continue with transport to ED.

15. **Evaluation of Pre-Existing Spinal Immobilization:** EMS providers in general should not remove Spinal Motion Restriction precautions placed by another EMS responder unless the immobilization compromises the patient's life or limb. A provider who is certified at a higher level of training/education may if deemed appropriate after completing a full spinal assessment per this protocol remove Spinal Motion Restriction. This needs to be reported to the Merced County EMS Agency. This needs to be conveyed to the receiving facility.

Note: If a patient is removed from Spinal Motion Restriction, the provider **MUST** complete an online Incident Report and submit the form to Merced County EMS within 24 hours.

The online Incident Report can be found on the EMS Agency web site at the following URL:
<http://www.co.merced.ca.us/forms.aspx?fid=41>

16. Mechanisms considered high risk are as follows:
- a. High-speed MVC
 - b. Falls greater than three times the patient's height
 - c. Axial loading/diving accidents
 - d. Change of plane accident
 - e. Penetrating wounds in or near the spinal column
 - f. Sports injuries to the head and/or neck
 - g. Unconscious trauma patient.
17. Please remember that in the very young and very old, a normal examination may not be sufficient to "rule-out" spinal injury.
18. Remember ill-fitting equipment may be worse than no equipment at all. More harm may be caused by a cervical collar that hyperextends the cervical spine that has been injured than by omitting the collar altogether.

Spinal Motion Restriction (SMR) Algorithm

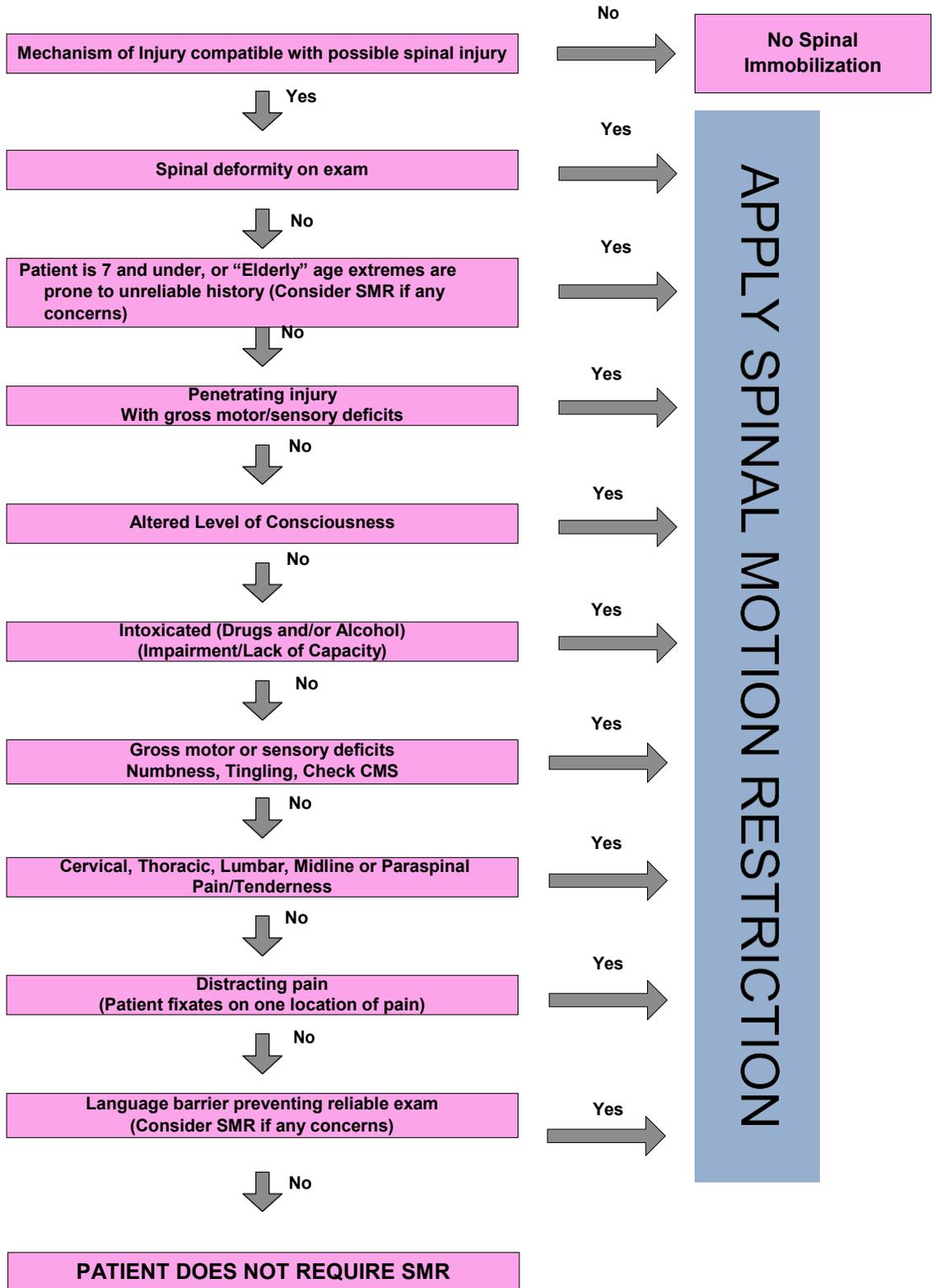
PEARLS

A rigid cervical collar **should not be placed or shall be removed** if the

1. Collar creates airway compromise
2. Appropriate sized collar is unavailable
3. Collar increases pain
4. Patients anatomy precludes fitting a collar (i.e. severe curvature of the spine)
5. Patient is combative and fighting application of the collar

* Patients already immobilized should remain immobilized
 * Patients with penetrating injuries do not require SMR unless they meet specific criteria in the algorithm
 * Long Spine Boards should be avoided in ambulatory patients
 * Elderly or kyphotic individuals requiring SMR may require vacuum immobilization devices
 * SMR does not take precedence over airway or cardiovascular stabilization
 * Leave helmets and shoulder pads in place unless they interfere with resuscitation

Ambulatory patients and those that can self-extricate, are cooperative, can follow instructions and who have only midline cervical or thoracic pain may be placed in a rigid collar and secured to the ambulance gurney **(No LSB Necessary)**



APPLY SPINAL MOTION RESTRICTION

IF THE PATIENT DOES NOT MEET ANY OF THE CRITERIA ABOVE ONLY THEN MAY THE PATIENT BE TRANSPORTED WITHOUT SPINAL MOTION RESTRICTION OR TRADITIONAL SPINAL IMMOBILIZATION