



## 8002.1 PURPOSE

To provide guidelines and recommendations for the spinal immobilization of pre-hospital patients in Napa County. The goals of immobilization are to prevent further spinal injury during patient extrication, treatment, and transport and to ensure patient comfort.

## 8002.2 EXPLANATION OF DEFINITIONS

- a. Altered Level of Consciousness: In general, a level that impairs patient's ability to understand questions and make rational decisions; this includes most patients with GCS < 14.
- b. Intoxicated: Denotes impairment by alcohol or drugs to the extent that a patient cannot reliably understand questions and/or make rational decisions and/or exhibit awareness sufficient to respond to a physical or verbal assessment.
- c. Uncooperative: State of unhelpfulness, disobedience or non-compliance for any reason that impairs patient's ability to reliably understand questions or make rational decisions and/or exhibit awareness sufficient to respond to a physical or verbal assessment.
- d. Age > 65 or < 5 Years Old: In general, patients at age extremes may be unable to reliably respond to a verbal or a physical assessment due to physiologic immaturity, underlying neurologic condition. Older patients may be more susceptible to injury due to bone density differences and abnormal perception of pain.
- e. Language Barrier: Means the patient's inability to understand or to respond appropriately to the provider. Provider should use reasonable effort to accommodate the language used by the patient including the use of friends, family and translation services. Providers should have a script for assessment available in Spanish and other prevalent dialects.
- f. Injury Detracting from a Reliable History and Exam: Patients may fail to appreciate pain due to injury at one site because of pain in another area of the body. A careful exam is important. In other cases, patients may be unable to or may have difficulty in responding to a verbal or physical assessment because of pain due to an injury. Consider the judicious use of pain medication.
- g. Gross Motor or Sensory Deficits: Performs to the State of Maine neurological exam (see below).
  1. Motor: Perform the following tests on each side, lower and upper extremities.
    - a. Upper – Ask the patient to extend and flex wrist against resistance.
    - b. Lower – Ask patient to dorsiflex and plantar flex foot against resistance.
  2. Sensory: Perform a “sharp vs. dull” discriminatory examination on all 4 extremities using 8 – 12 sites for each arm and each leg. Use a cotton wisp (or similar) for “dull” and a splintered tongue blade or straightened paper clip for sharp. Ask the patient “Can you please close your eyes and tell me, “sharp or dull”.
  3. Results: Inability to extend flex or failure to discriminate between “sharp” and “dull” is a failure of the test and may indicate spinal cord injury.
    - a. Sharp – Spinothalamic tract.
    - b. Dull – Posterior columns.

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- c. Motor – Corticospinal tract.
  - h. Spine Deformity: Observe the spine with the patient's entire back and neck exposed for any deformity. Observe the normal lordotic curvature.
  - i. Limited Cervical Active Range of Motion: After performing the other components of the assessment in a cooperative non-altered, linguistically competent patient, ask the patient to turn his/her head 30° to each side and gently flex the neck. Do not provide assistance or "help" the patient in any way. If the patient cannot perform or if he/she reports pain, stop the test and immobilize the cervical spine per protocol.
  - j. Midline Spinal Pain and Tenderness: There are two (2) different tests. Pain is subjective and is elicited by asking the patient; "Do you have pain or discomfort in your spine, down the middle from your head to your tailbone?" To be valid the pain reported by the patient should be midline-not in the shoulders or in the lateral muscles. Tenderness is elicited by palpation and is objective. Palpate from the occiput down to the coccyx using your index and/or middle fingers by "stair stepping," sequentially, down each midline bony protuberance (spinous process).

### 8002.3 CORE FUNDAMENTALS

- a. The incidence of true spinal cord injuries from both blunt and penetrating mechanisms is exceedingly low, and occurs less than 2 – 4 % of the time. The incidence of clinically significant spinal cord injuries without neurologic symptoms is extremely rare. The best candidates for full head-to-toe immobilization are victims of a high impact mechanism with multi-systems injuries.
- b. Most spinal injuries of any consequence present with spinal pain and vertebral tenderness to palpation. Alert and oriented patients with true spinal injuries tend to exhibit pain and tenderness to palpation, and generally vigorously self-splint. Substantial spinal injuries are best recognized with diligent physical exams. In general, ambulatory patients do not have serious thoraco-lumbar injuries.
- c. Mechanism of injury (MOI) without subjective complaints or objective findings of spinal injury is generally a poor predictor of injury. MOI should be more carefully considered in high risk patients (elderly and the young) and in those patients for whom an accurate history and physical examination cannot be obtained. Elderly patients and those with preexisting arthritis and other diseases which compromise their skeletal system are more likely to have spinal injuries after a traumatic mechanism. These patients should be more conservatively managed, and there should be a greater suspicion for occult – hidden – spinal injuries, especially in those patients with chronic confusion/dementia.
- d. Spinal immobilization should *reduce*, rather than *increase*, patient discomfort. Immobilization that increases pain should be avoided. Full spinal immobilization as traditionally practiced has often caused more injuries than it has prevented.
- e. Patients with suspected spinal injuries should be maintained in what is for them a "neutral", in-line position. This position will vary from patient to patient depending on the presence of arthritis or other spinal abnormalities. A patient's cervical spine should never be moved if movement increases pain, neurologic deficits, or neck spasms. The X-Collar (ideal in this situation) allows the pre-hospital provider to "splint in position of comfort" or "position found".
- f. Immobilization should be accomplished using the most appropriate tools for the specific circumstance. Napa County endorses equipment that allows for the comfortable immobilization of patients in such a fashion that further harm is not induced.
- g. Ill-fitting equipment is worse than no equipment at all. For example, more harm can be caused by a cervical collar that hyperextends a patient's injured cervical spine than by omitting a collar altogether.

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- h. Appropriate spinal immobilization depends on an accurate history and physical exam of the spine.
  - i. Spinal immobilization should not be utilized in order to simply extricate and move a patient.
  - j. There is no evidence that *supine* immobilization of the spine is better than placing patients in a *semi-fowler's* position. It is also clearly less comfortable.
  - k. Alert, neurologically intact victims of penetrating thoracic trauma without spinal pain do not need spinal immobilization. Victims of penetrating trauma, with neurological deficits require full spinal immobilization.
  - l. However, full spinal immobilization of penetrating thoracic trauma patients may increase mortality and morbidity, therefore spinal immobilization of penetrating trauma patients should never delay transportation.
  - m. If there is any doubt about the evaluation of a patient's spine, it is always better to immobilize the patient and defer further spinal evaluation to the ED / receiving facility staff.

#### **8002.4 IMMOBILIZATION GUIDELINES**

- a. Backboard's are not preferred, and if used, must be appropriately padded to prevent pain and pressure sores.
- b. Consider omission of X-Collar in reliable patient without cervical pain or tenderness who are immobilized in a vacuum device. The only Napa County approved cervical collar device is the X-Collar.
  - 1. The X-Collar is recommended for patients ranging from 10kg / 22lbs – 165kg / 360lbs.
  - 2. In patients outside of this weight range, the patient is encouraged to be immobilized using a vacuum splint / mattress, (refer to Figure 1. & 2. below).
- c. Partial immobilization of a patient with isolated cervical and/or tenderness pain is acceptable, and encouraged. This may include the use of a vacuum mattress, KED, vacuum splint, etc., with or without the X-Collar.
- d. Full spinal immobilization should be reserved primarily for patients who have received a high impact resulting in multiple systems blunt trauma, and/or who are unable to provide accurate information to field responders. This level of immobilization is more comfortable if vacuum splinting is utilized. backboard, vacuum mattress or vacuum splint and carrier, and
- e. If the utilization of a cervical collar indicated, the X-Collar is required. A vacuum splint / mattress is required to be utilized with a scoop, backboard or other appropriate carrier device.
- f. Concave "scoops" should be employed for moving patients whenever possible; backboards should be used only if these other devices are unavailable.
- g. Spinal movement and discomfort are reduced by allowing patients to self-extricate when possible, and to place themselves onto gurneys and spinal immobilization devices. Back-boarding patients from a standing position is discouraged.
- h. Logrolling patients is very uncomfortable and leads to increased spinal movement. The preferred technique to getting patients onto boards is to "forklift" the patient onto the backboard.
- i. Responders should document all history and exam findings on the pre-hospital care report (PCR). The patient's neurologic status pre and post-immobilization, along with all spinal immobilization interventions, should be documented.
- j. In patients without midline neck or back pain / tenderness, ALOC, intoxication, or injury detracting from a reliable history and exam, spinal immobilization may be withheld as long as the patient can be accurately evaluated.

## 8002.6 SPECIAL CONSIDERATIONS

- Exercise caution when evaluating high-risk patients (i.e. elderly, osteoporotic, degenerative disorders, diabetic patients, etc.) as they may present with minimal or no pain following a spinal injury.
- If the patient is greater than twenty (>20) weeks gestation and full spinal precautions is indicated; ensure steps are taken to minimize supine hypotension syndrome.
- Advanced airways should be secured with tape or a commercial device. Devices and tape should be applied in a manner that avoids compression of the front and sides of the neck, which may impair venous return from the brain (Refer to Advanced Airway Management Guideline # 9801).

## 8002.7 PEDIATRIC PATIENTS / CAR SEATS

- Infants restrained in a rear-facing car seat may be immobilized and extricated in the car seat. The child may remain in the car seat if the immobilization is secure and his / her condition allows (no signs of respiratory distress or shock).
- Children restrained in a car seat (with a high back) may be immobilized and extricated in the car seat; however, once removed from the vehicle, the child should be immobilized.
- Children restrained in a booster seat (without a back) need to be extricated and immobilized following standard spinal immobilization precautions.
- As clinically indicated utilize padding under the pediatric patient's head, shoulders and/or torso to facilitate proper neutral spinal immobilization.
- When no child restraint device is available or applicable, pediatric patients should be immobilized using a vacuum splint / mattress (refer to Figure 1. & 2. above).
  - The X-Collar is recommended for patients ranging from 10kg / 22lbs – 165kg / 360lbs.
  - In patients outside of this weight range, the patient should be immobilized using a vacuum splint / mattress, (refer to Figure 1. & 2. below).



Figure 1.



Figure 2.

## 8002.8 HELMET REMOVAL

Safe and proper removal of the helmet should be done by two (2) people following steps outlined in PHTLS or similar texts. (If applicable, refer to Football Helmet Removal Guideline # 8014 for further guidance).

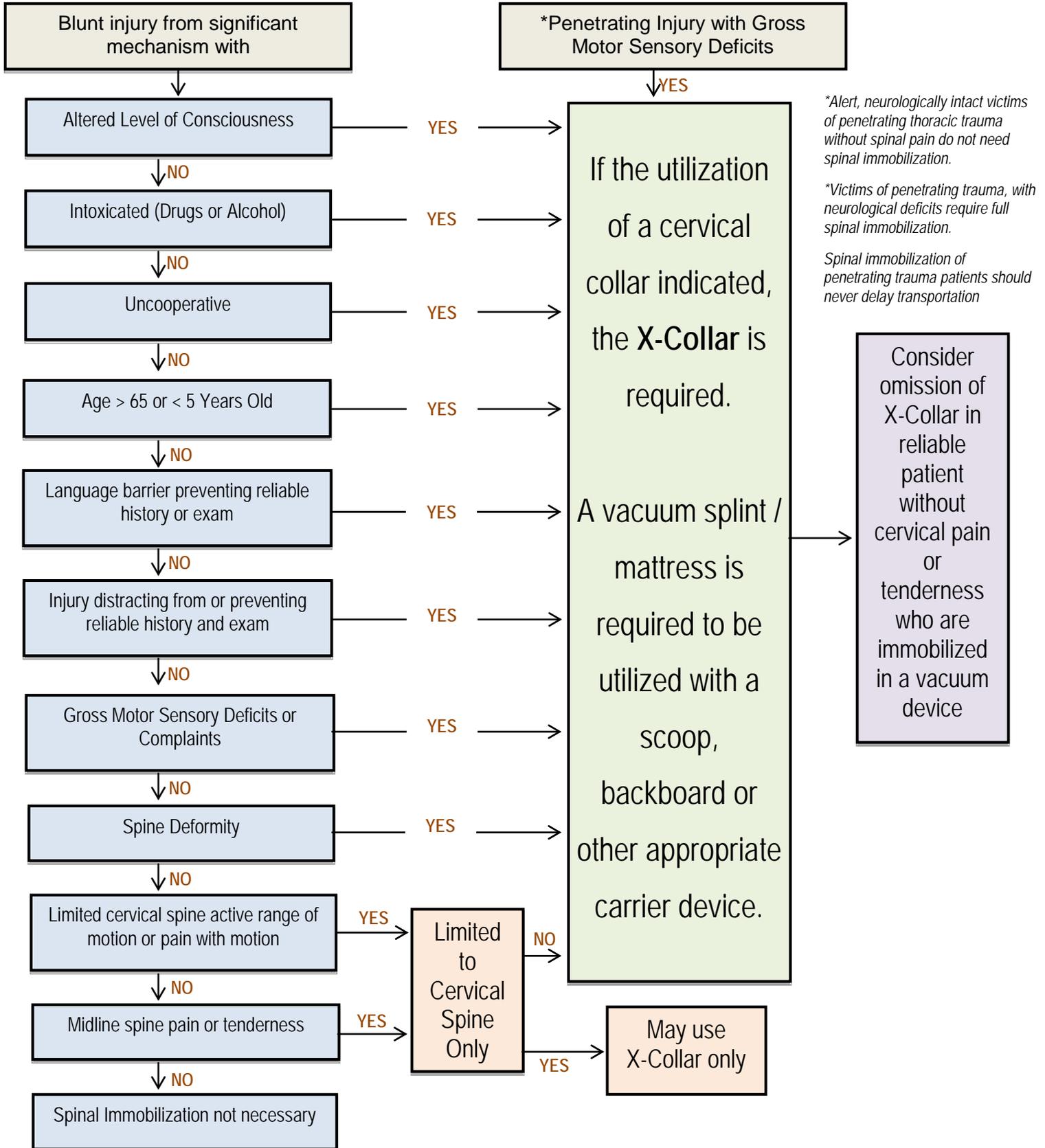
## 8002.7 REMOVAL OF SPINAL IMMOBLIZATION

Paramedics shall not remove spinal immobilization placed by another paramedic unless the immobilization compromises the patient's life or limb.

## 8002.8 SEDATION OF SPINALLY IMMOBLIZED PATIENTS

Ondansetron has been proven to be ineffective in the treatment of motion sickness. If mild sedation or treatment for motion sickness is indicated, refer to Sedation Guideline # 9005 and/or Severe Nausea / Vomiting Guideline # 9006.

## SPINAL IMMOBILIZATION



## APPROVED SPINAL IMMOBILIZATION EQUIPMENT



**Fasplint Halfback and Fullbody (Hartwell)**  
**Status: APPROVED-GOOD**



**RedVac VM 1122 (Kohlbrat and Bunz)**  
**Status: APPROVED-BEST**



**X-Collar Plus (Emegear)**  
**Status: APPROVED-BEST (ONLY approved cervical collar)**



**Soft Stretcher (Morrison) others are OK**  
**Status: APPROVED-GOOD**



**CombiCarrier II (Hartwell)**  
**Status: APPROVED-BEST**