**Introduction**

Spinal motion restriction is indicated for patients experiencing signs / symptoms of a possible spinal cord injury subsequent to trauma. All patients complaining of neck / back pain OR who have sustained injury from a mechanism of injury consistent with spinal cord injury will have a spinal injury assessment performed.

## A. Spinal Assessment

**SPINAL MOTION RESTRICTION EXCLUSION CRITERIA**

**Spinal motion restriction is not required when ALL of the following apply:**

1. Stable patient with normal peripheral perfusion signs.
2. Reliable Patient:
   a) ≥ 9 years old.
   b) Calm and cooperative.
   c) No altered mental status (e.g., dementia, preexisting brain injury, developmental delay, psychosis, etc.).
   d) No evidence of alcohol or drug intoxication.
   e) No acute stress reaction.
   f) Not distracted by circumstances or injuries to self or others.
   g) No communication barriers (e.g., deafness, language, etc.).
3. Patient denies spinal pain and no spinal tenderness is elicited with palpation. (This includes cervical, lumbar, thoracic and sacral pain).
4. Normal neurological function in all extremities:
   a) No numbness or tingling (paresthesia).
   b) Motor strength is full and symmetrical:
      1. Full range of motion on all uninjured limbs.
      2. Full range of motion of the neck

If the patient fails to meet **ANY** of the above conditions, or assessment cannot be completed, then the patient will be placed on a backboard with full spinal motion restriction.

**__NOTE:__

1. When Air Rescue is called for transport, the backboard or patient carry-all should be used to facilitate transport regardless of spinal motion restriction inclusion or exclusion criteria.

2. Any penetrating injury to the neck, chest or abdomen resulting in difficulty breathing or airway compromise may be placed in a position most beneficial to the patient as long as the patient can be transported safely in the aircraft as well as in a rescue.

## SPINAL MOTION RESTRICTION INCLUSION CRITERIA

Spinal Motion Restriction is necessary to prevent potentially life-threatening or further disabling injuries during the movement and transportation of the trauma victim. Indications for spinal motion restriction include:

1. **Physical findings:**

   a) Pain to or pain on movement of the neck or back.

   b) Point tenderness, deformity, and/or guarding of the spine area.

   c) Paralysis, paresis, numbness, or tingling in the arms or legs at any time post-insult.

   d) Signs or symptoms of neurogenic shock.

   e) Unconsciousness with suspected trauma.

   f) Possible injury to the spine when evaluation is difficult due to altered mental status.

   g) Significant injuries above the clavicles.

   h) High energy mechanism of injury together with:

      1) Alcohol and/or drug intoxication.
      2) Distracting, painful injury or communication barrier.

         A. “Distracting Painful Injuries associated with Cervical Spinal Injuries in “Blunt Trauma”, suggests:

            a) Any long bone fracture.
            b) Visceral injury necessitating possible surgery.
            c) Meets trauma criteria.

In situations not covered by the above, if clinical judgment indicates spinal cord injury, the patient may be placed on a backboard with full spinal motion restriction.

**Spinal Motion Restriction Guidelines**

1. Assemble necessary equipment:
    a) Long spine board
    b) Appropriate cervical collar
    c) Padding
    d) Blanket roll, or Headbed
    e) Straps (minimum of 3)
    f) 2-inch tape

## B. Spinal Motion Restriction of the supine/prone patient

*Adult Care*

*EMR / BLS*

1. Begin with manual stabilization of the head in a neutral, in-line position. Manual stabilization should be provided without interruption until complete patient spinal motion restriction is accomplished.
2. Contraindications to placement in an in-line position include:
    a) Neck muscle spasm
    b) Increased pain
    c) Onset of or increase of a neurological deficit such as numbness, tingling, or loss of motor ability.
    d) Compromise of the airway or ventilation
    e) If the patient's injuries are so severe that the head presents with such misalignment that it no longer appears to extend from the midline of the shoulders.
3. Size and apply the appropriate cervical collar. To size the collar, measure the distance, using your fingers, between the bottom of the jaw to the top of the trapezius muscle (**Illustration #1**).

a) In the rare instance an appropriately sized cervical collar is not available, maintain manual spinal restriction and complete the spinal motion restriction process without a cervical collar.

4. While maintaining manual stabilization with a collar in place, log roll the patient, position the backboard, and roll patient onto the board in a supine position.

5. Place blanket roll or head immobilizer in place.

6. Pad the space, as needed, between the back of the head and backboard to prevent hyperextension of the cervical vertebrae.

7. Secure the patient's body to the board with straps:

   a) Immobilize the upper torso to prevent upward sliding of patient's body during movement and transportation. This is accomplished by bringing straps over the shoulders and across the chest to make an X.

   b) Additional straps must be placed to prevent side-to-side movement of the body on the board. This can be accomplished by using circumferential straps across the upper chest, iliac crests, mid-to-distal thigh, or at the pelvis with groin loops.

   c) Arms should be placed at patient's side to prevent movement of the shoulder girdle.

   d) Secure both feet together to prevent rotary movement of the legs.

   e) Apply 2-inch tape directly across the forehead and secure the head while extending the tape under the backboard. DO NOT apply tape directly across the chin as this may create an airway obstruction. Tape may be placed across the surface of the semi-rigid cervical collar.

Note: If no straps are available for immobilizing a patient then elastic bandages (Ace® wrap type) may be utilized.

*Pediatric Care*

*EMR / BLS*

1. Begin with manual in-line stabilization of the head in a neutral, in-line position. Manual stabilization should be provided without interruption until complete spinal motion restriction is accomplished.

2. Contraindications to placement in an in-line position include:

   a) Neck muscle spasm

   b) Increased pain

   c) Onset of or increase of a neurological deficit such as numbness, tingling, or loss of motor ability.

d) Compromise of the airway or ventilation

e) If the patient's injuries are so severe that the head presents with such misalignment that it no longer appears to extend from the midline of the shoulders.

3. Size and apply the appropriate cervical collar. To size the collar, measure the distance, using your fingers, between the bottom of the jaw to the top of the trapezius muscle.

   a) If an appropriately sized cervical collar is not available, maintain manual stabilization and complete the spinal restriction process without a cervical collar.

4. While maintaining manual stabilization with a collar in place, log roll the patient, position the backboard, and roll patient onto the board in a supine position.

5. Place blanket roll or head immobilizer in place.

6. Pad underneath the scapula and back, lifting the shoulders and preventing hyperflexion of the neck due to the prominent occiput of the pediatric patient.

7. Secure the patient's body to the board with straps:

   a) Immobilize the upper torso to prevent upward sliding of patient's body during movement and transportation. This is accomplished by bringing straps over the shoulders and across the chest to make an X.

   b) Additional straps must be placed to prevent side-to-side movement of the body on the board. This can be accomplished by using circumferential straps across the upper chest, iliac crests, mid-to-distal thigh, or at the pelvis with groin loops.

   c) Strap the patient to the board after filling lateral void spaces, making the body as wide as the board.

   d) Arms should be placed at patient's side to prevent movement of the shoulder girdle.

   e) Secure both feet together to prevent rotary movement of the legs.

   f) Apply 2-inch tape directly across the forehead and secure the head while extending the tape under the backboard. DO NOT apply tape directly across the chin as this may create an airway obstruction. Tape may be placed across the surface of the semi-rigid cervical collar.

Note: If no straps are available for immobilizing a patient then elastic bandages (Ace® wrap type) may be utilized.

## B. Spinal Motion Restriction of the standing patient

*Adult Care*

*EMR / BLS*

1. Initiate manual stabilization of the head in a neutral in-line position. Approach the patient from the front to eliminate lateral movements.
2. Apply the appropriate cervical collar.
3. With one rescuer at each side of the board and the third holding the head, slowly lay the board down.
4. With the patient supine on the board now follow steps A4 thru A9.

## C. Vest-type extrication device (KED)

*Adult Care*

*BLS*

1. Initiate manual in-line stabilization of the head.
2. Apply the appropriate cervical collar.
3. Insert the device behind the patient. Try to limit movement while positioning the device.
4. Position the device so it fits securely under the axilla. Open the side flaps and place them around the patient's torso.
5. Position, connect and adjust the torso straps. Leave the uppermost strap loose until the head is immobilized.
6. Position and fasten each groin loop. Adjust one side at a time to prevent excess movement of the patient.
7. Place the pad behind the patient's head, filling the void to prevent hyperextension.
8. Position the head flaps. Fasten the forehead strap and apply the chinstrap over the cervical collar.

**CAUTION: The handles of the KED should not be used to lift, carry or move the patient.**

## The MDFR Spinal Injury Assessment

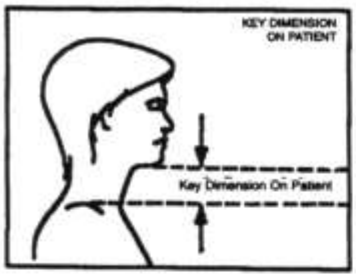
The following steps will be taken when you are assessing a patient with a complaint of neck and / or back pain associated with a traumatic incident.

| | | |
|---|---|---|
| **1** | The patient must be greater than or equal to 9 years of age, calm and cooperative with stable vital signs | If the patient is < 9 years of age, uncooperative, or you cannot get a reliable history of the incident, spinal motion restriction is indicated. |
| **2** | Assess the GCS. The patient should NOT have altered mental status | If the patient has altered mental status with suspected spinal injury, spinal motion restriction is indicated. |
| **3** | Assess for signs of drug or alcohol intoxication. Determine if the history of the incident includes intoxication. | If the patient has signs of drug or alcohol intoxication with suspected spinal injury, spinal motion restriction is indicated. |
| **4** | Palpate the midline neck and back over the spine | If the patient has tenderness over the area palpated or if you feel deformity, spinal motion restriction is indicated. |
| **5** | Have the patient move his/her extremities. Have the patient move the head up and down, then rotate left and right. | If the patient does not have an acceptable range of motion, or experiences severe neck pain upon movement of the head, spinal motion restriction is indicated. |

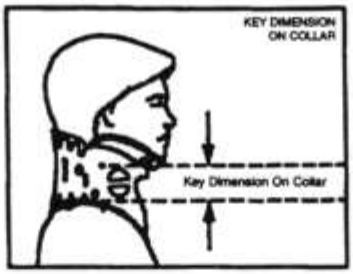
If the presentation of the patient indicates a spinal cord injury, spinal motion restriction is indicated.

***ILLUSTRATION #1***

SIZING METHOD




1. Proper sizing is critical for good patient care. Too short a collar may not provide enough support, while too tall a collar may hyperextend. The ***key dimension*** on a patient is the distance between an imaginary line drawn across the top shoulders, where the collar will sit and the bottom plane of the patient's chin.




2. The **key dimension** on the collar is the distance between the ***sizing post*** (back fastener) and the lower edge of the rigid plastic encircling band (not the foam padding).


3. When the patient is being held in a neutral [illegible], use your fingers to measure the distance [illegible] shoulder to the chin **(key dimension).**

***ILLUSTRATION #2***

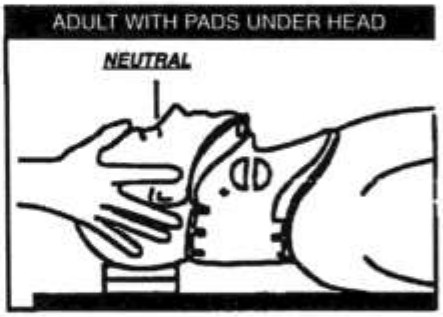
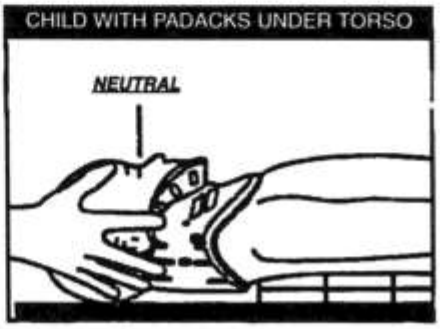




***ILLUSTRATION #3***

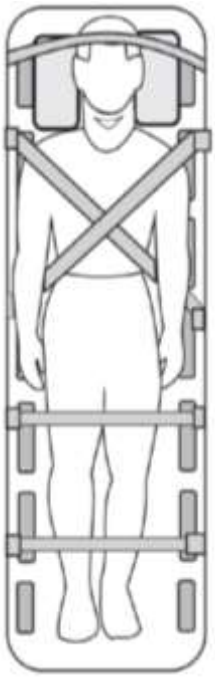


***Illustration #4***

Attach straps across the chest forming an "X"

Secure the head with 2" Tape

Secure the upper and lower legs

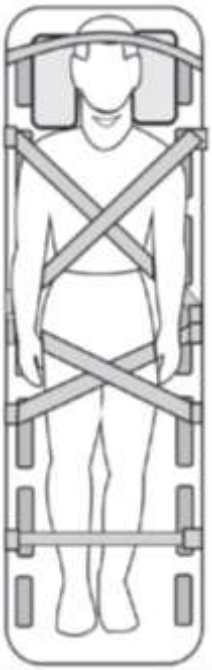


***Illustration #5***

Secure the chest by crossing the straps forming an "X"

Secure the pelvis and upper legs by crossing the straps forming an "X"

Secure the head with 2" Tape

Secure the lower legs

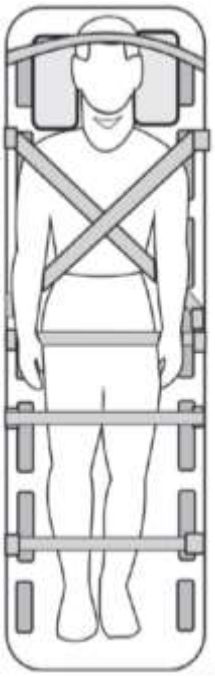


***Illustration #6***

Attach straps across the chest forming an "X"

Secure the pelvis with a strap across the iliac crests

Secure the head with 2" Tape

Secure the upper and lower legs