

Summary of the Wilderness Medical Society Practice Guidelines for Spine Immobilization in an Austere Environment

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Because of the potential for spinal cord injuries, trauma patients are frequently immobilized in the pre-hospital setting. Techniques for spine immobilization and extrication for trauma were developed not out of strong scientific evidence, but out of a desire to avoid causing further injury and because of medico-legal concerns. In a wilderness environment, spinal immobilization is a daunting task and could cause injury both to the patient and rescuers, as well as significant use of human and financial resources. Documented cases have demonstrated severe morbidity, and even mortality, due to immobilization itself. Spinal cord injuries are more likely to result from the actual inciting injury rather than if, or how, the patient was immobilized.

Given the resource utilization involved and consideration of the evidence, the Wilderness Medical Society convened an expert panel with two orthopedic surgeons, two EMTs, one emergency physician, and one family practitioner with sports medicine training to review the peer-reviewed literature, and develop guidelines on spinal immobilization in a wilderness setting. The panel published the *Wilderness Medical Society Practice Guidelines for Spine Immobilization in the Austere Environment* (see reference below) and concluded that **the primary goal should be to minimize the risk of missing or worsening an unstable injury**. The scientific evidence does not clearly show that spine immobilization reduces the incidence of bad neurologic outcomes, or how immobilization could affect further neurologic or traumatic injury. Given that immobilization can cause airway compromise and other problems, it could actually increase morbidity and mortality in some cases. The following are the panel's recommendations:

- 1) Preferred position for the spine:** neutral position. This means the natural curves of the cervical, thoracic, and lumbar spine are in good alignment. This can be achieved with light to moderate traction during extrication unless this increases pain, elicits a change in neurologic status, or is met with resistance.
- 2) Extrication:** Place a cervical collar and allow an individual to exit the situation under their own volition if they are alert and appropriate. One study used infrared six-camera motion-capture to evaluate neck motion during extrication from simulated motor vehicle collisions. Placing a collar and then allowing the individual to get out of the vehicle on their own resulted in the least motion of the cervical spine. If an individual cannot get out on their own, studies support using a Kendrick extrication (or similar) device plus a cervical collar.
- 3) Moving a patient with a potential or real spine injury to a backboard:** The lift and slide transfer to a backboard has been studied and shows better

stabilization than the log-roll. With a log-roll, one rescuer holds the c-spine while others roll the patient onto their side and place a backboard underneath. With the lift and slide method, the patient is lifted straight up while maintaining the spinal position. One rescuer holds the c-spine while 3-4 others straddle the patient and lift while a backboard is slid underneath. This provides less lateral and axial movement.

- 4) **How to hold the c-spine:** Better manual stabilization of the c-spine can be achieved with the trapezius squeeze as opposed to the head squeeze maneuver. This means maintaining the c-spine manually by holding the top of the shoulders with the hands and squeezing the head between the forearms, as opposed to holding the head and neck only with the hands.
- 5) **To c-collar or not to c-collar:** There is not much evidence to demonstrate how effective c-collars actually are. One study showed that individuals have quite a bit of variation in the amount of padding needed behind the head to achieve a “neutral position” with the torso. Other studies have shown c-collars can increase intracranial pressure, cause pressure ulcers, and make breathing more difficult. An improvised collar can be used to help with immobilization, but is likely not sufficient on its own without other neck and spinal support. If it prevents other emergent care, it should be deferred.

When deciding whether to place a c-collar in the pre-hospital setting, it is appropriate to use the NEXUS criteria or Canadian c-spine rule. One study of 6,500 patients showed that these criteria could still be applied even if there is concern for significant mechanism of injury.

- 6) **Backboard method:** The vacuum mattress has been studied and shown to be superior to the backboard for spinal immobilization and comfort in transport.
- 7) **Penetrating trauma:** In penetrating trauma, spinal immobilization is not recommended.

This diagram below from the *Guidelines* outlines the recommendations for when to immobilize a patient in a wilderness setting. These recommendations are adapted from the NEXUS criteria and Canadian c-spine rule.

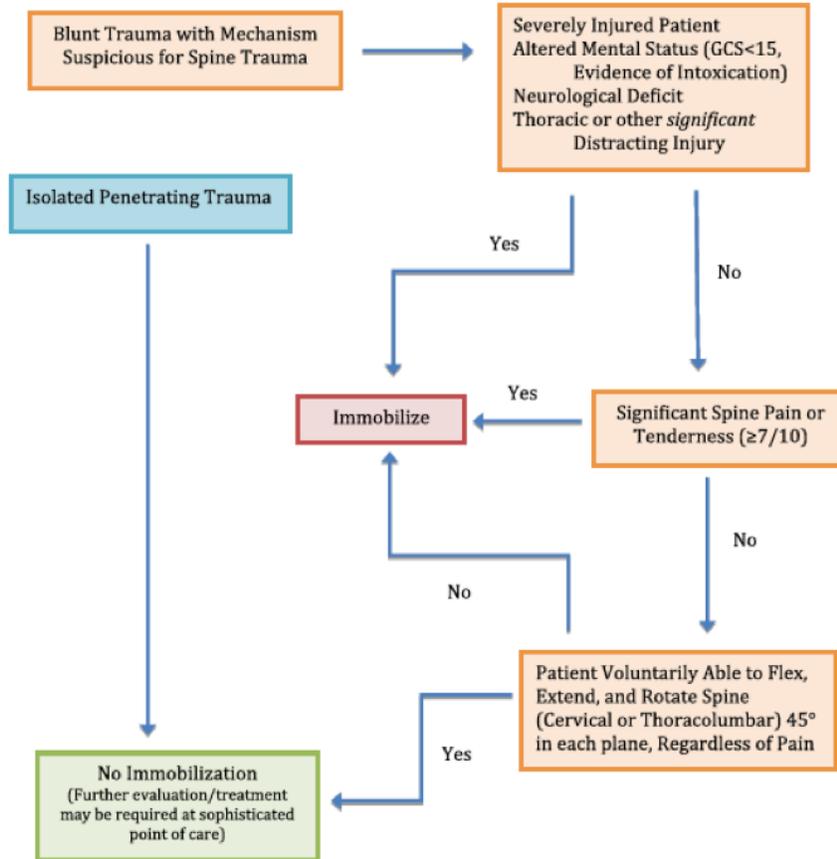


Figure 2. Recommendations for spine clearance and immobilization in the austere environment. GCS, Glasgow Coma Scale.

Reference: [Quinn RH, Williams J, Bennett BL, Stiller G, Islas AA, McCord S; Wilderness Medical Society practice guidelines for spine immobilization in the austere environment: 2014 update.](#)

[Wilderness Environ Med.](#) 2014 Dec;25(4 Suppl):S105-17.