

No Compelling Reasons to Use Cervical Collars

BY ANTHONY FIDACARO, MD,
& MATT S. FRIEDMAN, MD

The ancient Egyptian medical text, the Edwin Smith Surgical Papyrus, was created in approximately 1600 BC, and contains descriptions, diagnoses, prognoses, and treatments of 48 traumatic cases. Two of these described cervical spine injuries and determined that they are “an ailment not to be treated.” It has taken us nearly 60 years to recognize what the Egyptians knew 3,600 years ago.

Spinal immobilization has become widely controversial in the EMS community. Modern management of prehospital spinal cord injuries (SCI) dates to the 1960s and is universally featured in guidelines such as Advanced Trauma Life Support and Prehospital Trauma Life Support. This quote from the ATLS Course Manual dictates previous beliefs: “The staff must be continually cognizant that injudicious manipulation or movement and inadequate immobilization can cause additional spinal injury and decrease the patient’s overall prognosis.” (*Advanced Trauma Life Support*. Chicago: American College of Surgeons; 2007.) Despite widespread application, no randomized, controlled trials suggest a benefit to cervical immobilization. (*Cochrane Database Syst Rev* 2001;[2]:CD002803.) It is time to reconsider this dogma.

Historically, spinal immobilization was implemented to prevent secondary neurological injury associated with the movement of an unstable spinal cord injury in the prehospital setting. Unstable spinal cord injuries are rare, but the incidence of clinically important ones is 1.7 percent, with 0.1 percent developing neurological deficits. (*JAMA* 2001;286[15]:1841.) Advocates posit that collars restrict cervical spine motion, and traumatic patients are at risk for neurological deterioration without adequate immobilization during transport. No data, however, support this notion. (*Ann Emerg Med* 2007;50[3]:236.)

Subsequent patient movement during transport is inconsequential compared with the initial traumatic insult that causes SCI. (*Acad Emerg Med* 1998;5[3]:214.) No cases have been reported of deteriorating CSI in alert, cooperative patients as a

result of not immobilizing trauma patients at the scene. Conscious and stable patients limit their own movement without the application of a collar. The body acts as a natural splint utilizing adjacent paraspinal muscles as a protective muscle spasm, preventing movement of the injury site. (*Scand J Trauma Resusc Emerg Med* 2009;17:44.)

The ease of C-collar administration helped make its use widespread, and medicolegal concerns likely cemented it into prehospital textbooks. Mounting evidence suggests, however, that cervical collars, like backboards, are causing harm instead of adding benefit. (*Scand J Trauma Resusc Emerg Med* 2009;17:44.)

Collars are rarely placed properly. Every clinician knows they typically end up covering patients’ mouths and eyes prior to removal. Collars do reduce neck movement, but even correctly fitted ones allow more than 30 degrees of flexion/extension and rotation. (*J Athl Train* 2004;39[2]:138.) In fact, sandbags and tape limit movement more than a collar alone. (*J Trauma* 1983;23[6]:461.) The neck would need to be immobilized in all axes of movement to prevent any spinal motion.

Even when placed correctly, cervical collars lead to increased pressure sores, pain, and discomfort. (*J Trauma Nurs* 2014;21[3]:94; *Scand J Trauma Resusc Emerg Med* 2013;21:81; *Prehosp Emerg Care* 1998;2[2]:112; *Prehosp Emerg Care* 2002;6[4]:421.) A cadaver study revealed cervical collars increase separation between C1 and C2 by approximately 7 mm. (*J Trauma* 2010;69[2]:447.) Patients with ankylosing spondylitis or rheumatoid arthritis are at particular risk, and several case reports describe patient deterioration after collar application. (*BMJ* 1999;319[7203]:171.)

Airway management plays a critical role in trauma patients, and cervical collars add a significant impediment. Rigid collars limit the oropharyngeal opening by 25 percent in some patients. (*Br J Anaesth* 2005;95[3]:344.) Any limitation in unstable trauma patients requiring emergent airway management can significantly reduce first-pass success, leading to worse outcomes. Endotracheal intubation has never been shown to worsen CSI, though outcomes of this scenario may be underreported. (*Br J Anaesth*



2000;85[4]:665; *Ann Emerg Med* 2007;50[3]:236.)

Cervical collars do not just complicate airway management; they also increase intracranial pressure, a sequela more pronounced when a head injury is present. (*J Trauma* 2002;53[6]:1185.) Cervical collars compress the jugular vessels, decreasing venous return and exacerbating a deleterious condition in TBI patients. Cervical collars create unnecessary radiological and financial burdens, too. A pediatric ED study examining children who arrived with a C-collar in place were more likely to complain of pain, undergo imaging, have increased radiation exposure, and have higher admission rates. (*Prehosp Emerg Care* 2012;16[4]:513.)

A retrospective EMS study compared patients with blunt traumatic spinal injuries who received spinal immobilization with others who did not. (*Acad Emerg Med* 1998;5[3]:214.) Significantly less neurologic disability was seen in the cohort that was not immobilized. The authors concluded that prehospital immobilization has little or no effect on neurological outcome in patients with blunt spinal injuries.

Spinal injuries from penetrating trauma are rare. When SCI occurs, the neurological deficits are readily apparent on physical examination and generally never improve. (*J Trauma* 2011;70[4]:870.) And morbidity and mortality worsened when patients with penetrating trauma were immobilized. (*J Trauma* 2010;68[1]:115; *Injury* 2009;40[8]:880.) Guidelines by the American College of Surgeons and Prehospital Trauma Life Support now advise against spinal immobilization in patients with penetrating trauma. (*J Trauma* 2011;71[3]:763.)

The Canadian C-Spine Rule also has been validated in the prehospital setting, which proves prehospital providers can clear the spine at the scene, saving patients from undue pain, radiation exposure, prolonged length of stay in EDs, and financial responsibility. (*Ann Emerg Med* 2009;54[5]:663.) A statewide initiative demonstrated that implementation of a selective spinal motion restriction protocol reduced C-collar use by 50 percent. (*J Trauma* 2006;61[1]:161.)

We owe it to our patients to first do no harm. That starts at the prehospital scene by leaving the cervical collar in the ambulance. **EMN**



Dr. Fidacaro is the chief resident of emergency medicine at Maimonides Medical Center in Brooklyn, NY, where **Dr. Friedman** is the associate medical director of prehospital care and the director of the EMS clerkship for the department of emergency medicine.