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Collar Me Bad

Study prompts worries that cervical devices may harm some patients

There's little in EMS more automatic than applying cervical collars to patients with possible neck injuries. That doing this might in some cases harm them is a horrifying prospect. But that's an implication raised by research published earlier this year by the *Journal of Trauma*.

A team led by Baylor University orthopedist Peleg Ben-Galim, MD, found that using extrication collars in the presence of severe dissociative neck injuries can result in abnormal separation within the upper cervical spine. On cadaver models with recreated c-spine injuries, collars produced a separation of 7.3 +/- 4.0 mm between C1 and C2.

"Cervical extrication collars are put on about 15 million times a year... to protect the cervical spine in case of a bad injury," co-investigator John Hipp, PhD, director of Baylor's Spine

Research Lab, said in announcing the findings. "It is known that after a person has a bad injury, you can create a secondary injury very easily. We have discovered that the cervical collar, in

and after application of a rigid collar and some typical patient maneuvers. Distraction was clearly visible—the collar consistently pushed the head up and away from the shoulders. In a living

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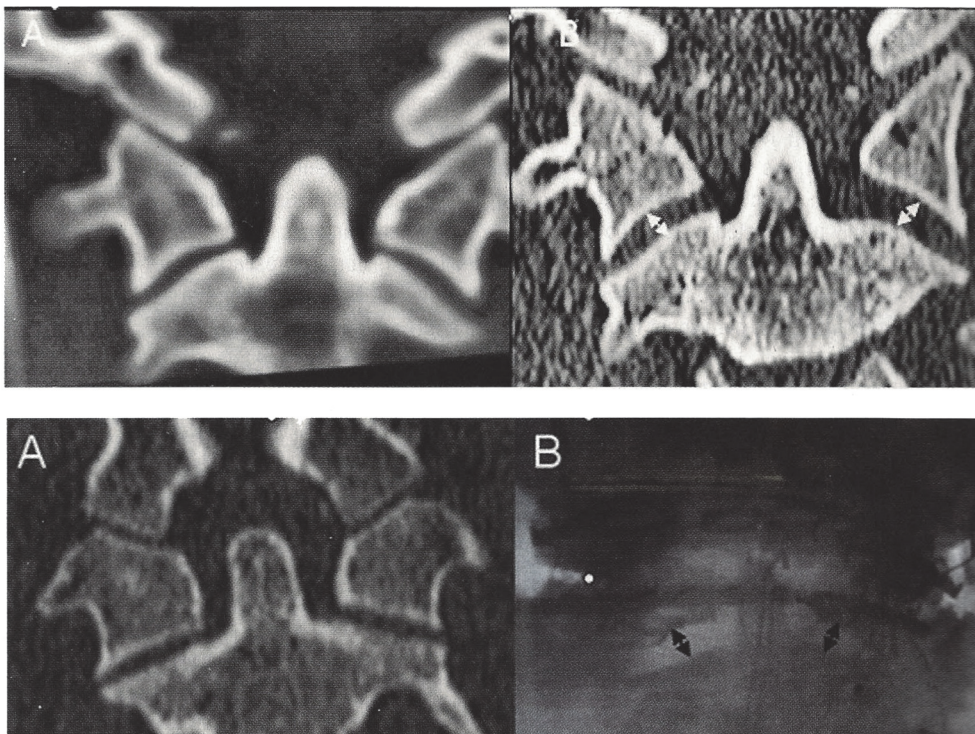
The cadaver recreations were based on real cases. Researchers cut the bodies' neck ligaments and membranes but left supporting musculature, then captured images by x-ray, fluoroscopy and/or CT scan before

patient with unstable cervical anatomy, this could contribute to secondary injury—or worse.

What this means for EMS, though, probably isn't all that much yet. It's certainly not enough to send systems out changing standards of care. C-collars remain appropriate and safe for most of the patients on whom they're used. But there are definitely some things we should take from these findings.

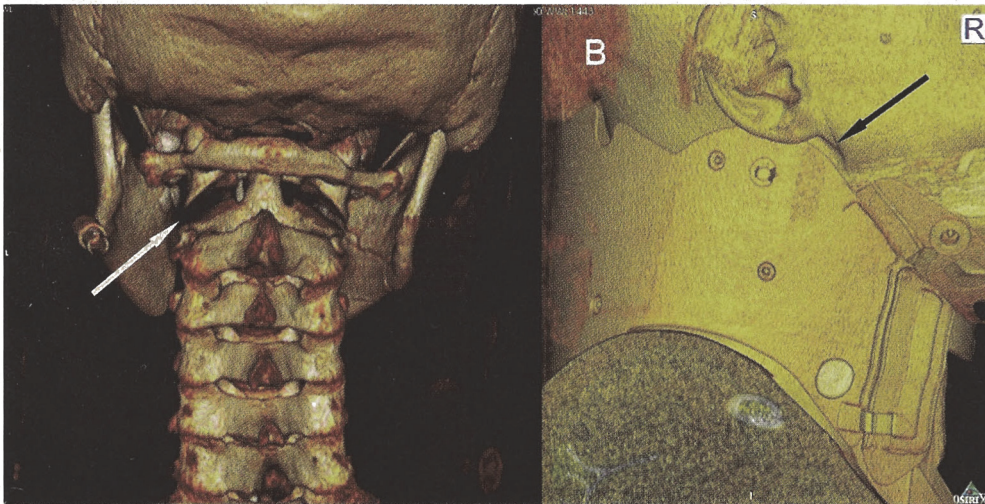
"It's a call to bring everyone back to the basics," says Houston Fire Department Medical Director David Perse, MD, EMT-P, FACEP, who spoke on the data at the Gathering of Eagles conference. "When people have cervical spinal injuries, the neck by definition is unstable, so as you care for that patient, you need to make sure you move that neck as little as possible. With internal decapitation injuries, contrary to what some may believe, not all patients die before EMS arrives on scene, and a few actually survive to the hospital. That makes it important that we either identify them in the field, or at least care for them properly."

It's worth noting that the types of injuries examined here would typically be fatal in the field. However, fluoroscopy has documented the same effect on a living patient with a high



These distractions were documented in patients with severe dissociative neck injuries who received cervical immobilization in the field and survived to the hospital.

Photos courtesy Baylor College of Medicine



Even correctly fitting collars can allow a slight side-to-side wobble, investigators found.

cervical injury, and dissociation need not be complete for additional spinal cord trauma to occur.

So EMS needs to be vigilant about the neck. The difficulty is that severe neck injuries are often accompanied by substantial other trauma. Victims will likely have other injuries that demand providers' attention. And, more difficult still, if our current methods of c-spine immobilization are suboptimal, then what? What should we use instead?

For now, if you're a concerned chief or medical director, it's a call to emphasize technique. The purpose of collars is to minimize movement of the head and neck. Hard collars may not do that much better than soft collars and head blocks—as the Baylor team showed, even a correctly sized collar can allow a slight lateral wobble when a board tilts. Providers must also guard against any tendency, when holding stabilization on the head, to unconsciously provide gentle traction.

"We need to be smarter than the problem," says Persse. "Our guys need to be aware, when they come across somebody who's in a rapid-deceleration injury or fall or whatever, of paying attention to the neck. You want to try to have and keep the head in a neutral position. Depending on circumstances, there may be half a dozen different ways to do that, but the goal is a neutral position, and not to be distracting."

To drive the point home in Houston, personnel were shown the fluoroscopic

images of the vertebral separation. "With the experience of just watching that," says Persse, "silence would fall across the room."

Additional research published by the *Journal of Trauma* also found higher mortality in victims of penetrating trauma who were spine-immobilized. Those authors, from Johns Hopkins, advised against the routine use of spinal immobilization for those patients.

With dissociative neck injuries, most

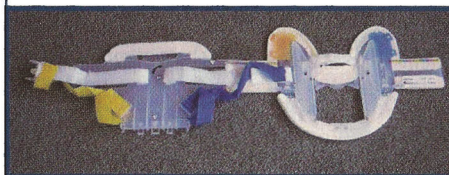
mechanisms will be blunt, and the Baylor team wasn't able, in reviewing trauma center records, to find any patients who'd survived them. They did, however, find a handful who experienced otherwise-unexplained hypotension and died.

"That was unnerving," says Persse. "Now they're wondering if those folks could all have been in neurogenic shock when everybody was looking for sources of hypovolemic shock, which they could never find." ▾

Splinting Cervical Injuries in Position

You want your patient's head in a neutral position, but patients with potential cervical injuries aren't always found that way. Being "smarter than the problem" could mean splinting them in the position found, rather than moving an unstable neck.

"Say a patient fell out of a tree and landed on his shoulders and neck, and he's complaining his neck hurts really, really bad," says Houston Fire Department Medical Director David Persse, MD, EMT-P, FACEP. "His head's turned to the left. He can feel and wiggle his fingers and toes. You probably need to move him with minimal movement to his neck, but you're not going to get him into a standard collar with his head turned. You have to kind of splint them as they lie."



That may take you back to the days of improvising with sweatshirts and sandbags. Another option could be products like EmeGear's XCollar and NexSplint,

which can be applied to patients in their position of injury, allowing use on those who are asymmetrical. While they may not reduce potential distraction in severe neck injuries, they do seem to reduce movement: A study by the University of Pittsburgh's Emergency Responder Human Performance Laboratory found the XCollar more protective against movement in all directions—flexion/extension, left and right flexion and left and right rotation—on both seated and boarded patients than other collars tested.

The NexSplint was named a Top Innovation at EMS EXPO in 2008. For more, visit www.XCollar.com.