The literature currently recommends the use of a long spine board when stabilizing an acute cervical spine-injured athlete.1 Patients who arrive to the emergency department (ED) immobilized may remain immobilized for a significant period of time until they are cleared to be removed from the board; therefore, it is vital that patient comfort is recognized and addressed.

In a 2006 survey of ED, 21% of departments were still leaving patients on spinal boards routinely until radiological evidence provided clearance, while 45% placed patients on spinal boards after their arrival even if they were not previously spine boarded in pre-hospital emergency management.1

Although patient comfort is important, cervical spinal stabilization must not be jeopardized in favor of comfort levels. However, the efficacy of long boards regarding comfort and cervical spine stability is unclear when compared to other full-body stabilizing devices.

To systematically review literature and evaluate the effectiveness of vacuum mattresses compared to long boards for patient comfort and cervical spine stability.

**Clinical Question/Objective**

**Data Source**

Articles were identified from the following electronic databases:

1. Cumulative Index to Nursing and Allied Health Literature (CINAHL) plus
2. Medline
3. Science Direct

**Key terms used included:**

1. “Cervical spinal stability” AND “spine board”
2. “ROM” AND “spine board”
3. “Patient comfort” AND “spine board”
4. “Pre-hospital” AND “spine board”
5. Studies could be either full reports or abstracts meeting the inclusion criteria in table 1.

**Data Synthesis**

- The initial search using the key terms from the data source generated 223 articles.
- Nine studies met the inclusion criteria: eight full reports and one abstract.4-12
- The PEDro scores for the eight full reports ranged from 4 to 7.6 points (maximum score=10 points) with an average of 5.9±1.2.
- Where subject data was available, healthy subjects had a mean age of 29.6 years (range 16-53), mean height of 172.37cm, and mean weight of 72.82kg.
- Males accounted for 72% (n=101) of subjects, while women accounted for 28% (n=39).
- All studies examined patient comfort,4-12 while only three focused on cervical spine movement.5,7,10
- One hundred percent of studies (9/9) found subjects experienced less pain using the vacuum mattress compared to the long boards, while 100% (3/3) noted a significant decrease in cervical spine movement using a vacuum mattress (with or without a cervical collar).1
- In one study, subjects were 3.08 times more likely to complain of symptoms of some kind when immobilized on a long board compared to a vacuum mattress after adjusting for effect of order of exposure (p<0.001),4 while a separate study found that movement at the head and shoulders was less for the vacuum mattress compared to the long board (without collar: 0.8±1.4cm vs.1.5±1.7 cm, p<.001).10

**Data Extraction**

- Three reviewers independently assessed and graded each study on the Physiotherapy Evidence Database (PEDro) scale. Data of interest were methodological assessment and descriptive data (e.g., means, frequency, and 95% confidence intervals when available) of the main outcome measures (Table 2).

**Table 1. Inclusion Criteria.**

| 1. Peer-reviewed (full reports or abstracts), randomized controlled trials, or controlled or comparative trials without randomization |
| 2. Written in English |
| 3. Available abstract |
| 4. Included key outcomes measuring patient comfort (i.e., pain) and cervical spine movement (i.e., ROM) |

**Discussion**

- The data collected shows that vacuum mattresses stabilize the cervical spine as well as a long spine board.
- Vacuum mattresses (Figure 1) have collectively shown better patient comfort during extended periods of time while strapped to the device compared to a long spine board (Figure 2).

**Conclusions**

- Although the long spine board is considered the traditional and most widely used full-body immobilization device, a vacuum mattress may be more appropriate for certain situations (i.e., confined areas, unstable surfaces, etc.) and is a more comfortable choice for athletes.1
- When confronted with a spine-injured athlete, athletic trainers and pre-emergency medical providers have options available when preparing an athlete for transportation.

**References**