Objectives

• Understand where the past 30 years of pre-hospital spinal immobilization practices originated from.
• Have a understanding of what the current evidence shows.
  – Pre-hospital spinal immobilization impossible
  – LBB’s can be harmful
• Have a knowledge of how practices are being adapted related to current evidence.
• Approximately 2% of ER patients have any spinal injury.
• There are currently between 250,000 - 400,000 Americans living with a spinal cord injury. More than 13,000 additional people are injured each year.
• Over 1 million arrive immobilized for spinal evaluation

• Who needs spinal motion restriction?
• What does spinal motion restriction consist of?
• What does it hurt?

Where It Started
Where it Started

- A 1963 survey of a large series of patients with fatal injuries treated at the Edinburgh Royal Infirmary showed that 25% of fatal complications occurred during the period between the accident and arrival in the ED
- “A community depends on the expertise of its emergency personnel to correctly manage high risk crises and potentiate recovery”
• A 1965 retrospective study of 958 spinal cord injury patients in Toronto attempted to quantify serious cord damage due to “inept handling of the patients”
• Only 29 patients (3%) had “incontrovertible” evidence of delayed paralysis, attributed to either pre- or in-hospital inept handling
• Authors suspected but could not prove that “a larger number (25%) undoubtedly suffered this fate”

In 1966, USAF Col. L. C. Kossuth first described the use of the long backboard to “move a victim from the vehicle with a minimum of additional trauma”
• Such movement was to occur with “due regard to maximum gentleness”

• “The most frequently mishandled injuries, made worse by hasty and rough movement from a vehicle or other accident scene, are fractures of the spine and the femur.”

J.D. Farrington, MD, from DEATH IN A DITCH, American College of Surgeons, 1967
• 1989 Garfin stated ‘no patient should be extricated from a crashed vehicle or transported from an accident scene without spinal immobilization

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• 1989 study of 170 trauma victims eventually discharged from a major ED showed a significant reduction in c- and l- spine pain when patients were allowed off the boards

• 21% had cervical P/T on the board but not off suggested that the immobilization process or the boards themselves cause pain that otherwise would not be there

• 1993 study caused 100% of 21 healthy volunteers to report pain within 30 minutes of being strapped to a backboard

• Headache, sacral, lumbar, and mandibular pain most common
• A prospective study at Charity Hospital 1988 of the association between immobilization in the immediate post injury period and the development of pressure ulcers in spinal cord-injured patients
• Time on the spinal board was significantly associated with ulcers developing within 8 days

• A 1995 study at Methodist Hospital of Indiana measured the interface (contact) pressures over bony prominences of 20 patients on wooden backboards over 80 minutes
• Interface pressure > 32 mm Hg causes capillaries collapse, resulting in ischemia and pressure ulceration.
• This study measured mean interface pressures as high as 149 mm Hg at the sacrum, 59 mm Hg at occiput, and 51 mm Hg at heels

• 1987 study at Beaumont Hospital of healthy, backboarded males concluded that backboard straps significantly decrease pulmonary function
• Similar study 1999 showed 15% respiratory restriction in backboarded adult subjects
• Pediatric study in 1991 showed decreased FVC in children due to backboard straps
1998 - 5 year retrospective chart review at University of New Mexico and University of Malaysia hospitals
All 454 patients with acute spinal cord injuries included during the 5 year study period
None of the 120 U. Malaysia patients were immobilized
All 334 U. of NM patients were immobilized in the field
Hospitals and treatment otherwise equivalent
Results: 2x MORE neurologic disability in the University of New Mexico patients

C-Spine imaging in the ED
By the late 1980s, physicians realized that some patients with neck pain did not need x-rays to rule out spine injury
Several studies showed that patients could be “clinically cleared” without exposing them to radiation

NEXUS and Canadian C-Spine rules
These were the two major studies showing the safety of clinical spine clearance by emergency physicians
- 1992 NEXUS = National Emergency X-Radiography Utilization Group, formed to reduce patient exposure to x-rays
- 2001 Canadian C-Spine rule developed for similar reasons
• ATLS-2002 ACS changes recommendations and training
• TNCC- 2006 ENA changes recommendation and training

2014
• American College of Surgeons (ACS) and National Association of EMS Physicians (NAEMS) position statement.
  – The benefit of long backboards is largely unproven.
  – LBB can induce pain, agitation, resp. compromise, and pressure ulcers.
  – Direction for what patients should and should not be considered for LBB
  – Whether or not a backboard is used, attention to spinal precautions among at-risk patients is paramount. These include application of a cervical collar, adequate security to a stretcher, minimal movement/transfers, and maintenance of inline stabilization during any necessary movement/transfers.

2015
• American College of Emergency Physicians (ACEP).
  – Current out-of-hospital management practices of patients with potential spinal injury lack evidentiary scientific support.
  – Evidence demonstrates that some of these current out-of-hospital care practices cause harm including airway compromise, respiratory impairment, aspiration, tissue ischemia, increased intracranial pressure, and pain, and can result in increased use of diagnostic imaging and mortality.
2015
• American College of Emergency Physicians (ACEP).
  – Spinal Immobilization vs Spinal Restriction
    • Spinal Immobilization is impossible
  – Spinal Restrictions should be considered for patients meeting NEXUS and Canadian rules.
    • Altered level of consciousness or clinical intoxication
    • Mid-line spinal pain and/or tenderness
    • Focal neurologic signs and/or symptoms (e.g., numbness and/or motor weakness)
    • Anatomic deformity of the spine
    • Distracting injury

2015
• American College of Emergency Physicians (ACEP).
  • Backboards should not be used as therapeutic intervention or as a precautionary measure either inside or outside the hospital or for inter-facility transfers. Spinal immobilization should not be used for patients with penetrating trauma without evidence of spinal injury.
  • Patient movement and transfer practices should be coordinated with receiving facility personnel.

http://www.ems1.com/backboard-stretcher/articles/2205246-5-creative-uses-for-backboards/
• “Backboards Neutralize the C-Spine”
  – 1991 we learned that spine boards are not ideal for neutral spine alignment.
  – Required up to 3.75 inches of padding to achieve neutrality and comfort

http://roguemedic.com/2013/05/spinal-immobilization-untested-and-unreasonable/

“Im not going into a trauma center without a patient on a backboard.”

– American College of Surgeons 2014
– National association of EMS Physicians 2014
– American College of Emergency Physicians 2015
• “It Can only Help”
  – At 20 minutes risk for pressure ulcers
  – Respiratory function
  – Pain

• “All Trauma Patients Need Full Immobilization.”
  – Immobilization should not be attempted in penetrating trauma. ACS and ACEP.
  – No standing take downs.

• “If we put them on a backboard to extricate we need to leave them on it.”
  – ACS and ACEP emphasize that Spine Boards are not therapeutic.
  – However DO NOT delay care of a critical patient to remove the Spine Board.
• “NO more back boards but they all get collars.”
  – Unless they are shot or stabbed before crashing their car ACS and ACEP do not recommend a c-collar in penetrating trauma

• “I will be sued”
  – Proper protocols and training based on up to date data are your best defense in all medical practice.

• “Only the Doctor can remove the backboard”
  – Very much local protocol based
  – Every ED should have a protocol allowing RN to remove backboards.
• Backboards are still a must for extrication.
  – A clinical trial of 31 subjects comparing degrees of sagittal, lateral, and axial motion of the C3 and T12 spinous processes during baseline, application of device, secured logroll, and lifting showed both significantly less motion, superior comfort, and increased perceived security with scoop vs backboard.

**Summary**

• Local Protocol Rules!
• A lot of new information regarding Spinal Restriction
  – LBB are not therapeutic.
  – LBB can cause pressure ulcers, resp. distress, and pain.
  – Penetrating trauma alone does not indicate spinal restriction
  – Spinal motion restriction should not delay life saving interventions
  – ED protocols should include RN removal.
References