

# Training Bulletin

## **Penetrating Chest Injuries**

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# Penetrating Chest Injuries

Nail guns have been used in the construction industry for almost 50 years. In recent years, the household use of these tools has grown quickly. As a result, the number of injuries associated with these devices is also on the rise. There are numerous case reports of severe and lethal injuries from nail guns including a significant number of penetrating chest injuries.

It is the unique nature of a penetrating chest injury presentation that presents a challenge to medical personnel particularly paramedics. A very thin projectile penetrating the chest (and possibly the heart) may only appear as a trivial wound to the skin. The extent of the damage caused by the projectile may not be immediately evident in the clinical presentation. Signs, symptoms and vital signs may all present as normal immediately after the injury.

Nail guns are only one mechanism of potential penetrating chest injury. Paramedics must maintain a high index of suspicion of significant, potentially life-threatening injury for any penetrating injury, particularly those to the chest. This includes any penetrating injury to the torso where the path of injury may involve the structures of the chest cavity. Penetrating injury to the “cardiac box<sup>1</sup>” may lead to injury to the heart and the great vessels.

EMS providers should be aware of the fact that even a seemingly innocuous penetrating injury anywhere in the cardiac box including the epigastric area has potential to include a life-threatening cardiac injury.

Potential life/function threats include:

- Tension pneumothorax
- Cardiac tamponade
- Intra thoracic hemorrhage
- Sucking chest wound
- Spinal cord injury
- Other concurrent injuries (such as injury to arteries, veins or nerves deep to the puncture wound).

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<sup>1</sup> The cardiac box is a rectangular anatomic area of the anterior chest bounded superiorly by the clavicles, laterally by the midclavicular lines, and inferiorly by the costal margins including the epigastric area.

The *Basic Life Support Patient Care Standards, Chest Injury – Blunt, Penetrating Standard*, directs paramedics to conduct the following **assessments** in all cases where chest injuries are suspected:

- Conduct a Scene Survey
- Determine Mechanism of Injury (maintain high index of suspicion for penetrating injuries)
- Perform Primary Survey
- Transport Decision – Load and Go Decision?
- Elicit Incident History (maintain high index of suspicion for penetrating injuries)
- Secondary Survey (close physical inspection for penetrating injuries)
  - Assess for tracheal deviation
  - Assess for decreased air entry
  - Assess for signs of airway and/or vascular penetration
- Cardiac monitoring

This Standard also details the **management** of patients specific to all chest injuries including:

- Stabilize/immobilize neck and spine if indicated
- Administer high concentration oxygen
- Assist ventilation as required
- Position patient as appropriate for injuries
- Manage shock if obvious/impending

All puncture wounds to the chest should be considered serious and paramedics must be thorough in their assessment while maintaining a high index of suspicion for serious injury even if apparently trivial entry wounds are the only physical signs of injury.

#### References:

*Basic Life Support Patient Care Standards, Version 2.0* (January 2007)  
Ministry of Health and Long-Term Care, Emergency Health Services Branch

