Learning Objectives

Upon the completion of this program participants will be able to:

- Describe the prehospital identification and treatment of crush injuries and compartment syndrome.

Crush Injuries

- Crush injuries are relatively uncommon.
  - They cause acute traumatic peripheral ischemia.
- Often found in disaster situations:
  - Earthquakes
  - Bombings
  - Tornadoes/cyclones
  - Hurricanes/typhoons
Crush Injuries

- Crush injuries can also occur in non-disaster situations:
  - Axial injuries:
    - Traumatic asphyxia
    - Suffocation
  - Appendicular injuries:
    - Crush syndrome
    - Compartment syndrome

Crush Injuries

- Crush injury and compartment syndrome are different processes with a common pathophysiology
- Crush injury occurs in 2 phases
  - Mechanical cell disruption
  - Ischemia
- Crush syndrome associated with increased external pressure to a body part or region
- Compartment syndrome results from increased pressure within a muscle compartment

Crush Injuries

- Mechanism of injury:
  - Ischemia and hypoxia at injury site
  - Gradient of injury
  - Self-perpetuation of injury
- Compartment pressures:
  - < 10 mmHg normal
  - 10-20 mmHg may be tolerated without significant damage
  - 30-50 mmHg can cause tissue toxicity over a few hours
  - Difference between measured compartment pressure and diastolic pressure may be a better determinant of irreversible damage
Crush Injuries

- Pathophysiology:
  - Release of muscle toxins and hypovolemia:
    - Hyperkalemia
    - Hypocalcaemia
    - Acidosis (local and systemic)
    - DIC (thromboplastin release)
  - Renal failure:
    - Myoglobinuria

- Signs and symptoms:
  - Crush injury obvious
  - Compartment syndrome:
    - Pain
    - Paresthesia
    - Passive stretch
    - Pressure
    - Pulelessness
    - Myoglobinuria

- Treatment:
  - Supplemental oxygen
  - Analgesia
  - Fasciotomy
  - Rhabdomyolysis:
    - Fluids
    - NaHCO₃
  - Transport destination important:
    - Surgical capabilities
    - Hemodialysis
    - HBO
Take-Home Points

• Crush injuries and compartment syndrome have the same pathophysiology
• Prehospital care involves recognition, treatment and transport
• Fluid resuscitation in the field is often important in preventing complications associated with rhabdomyolysis