The following protocol is designed to focus on patient care not covered in the Initial Assessment/Care Protocol 1 and specific injuries such as burns, amputations, etc. that require specialized care. Patients meeting Trauma Alert Criteria should be transported immediately, with scene times as minimal as possible. Aside from extrication, on scene times should be no greater than 10 minutes. (For Field Amputations, Refer to Protocol 31)

A Trauma Alert will be declared for patients with injuries that meet Trauma Alert Criteria that have occurred within the last 24-hours.

**General Care**

**EMR/BLS**

1. Initial Assessment/Care
2. The mode of transportation to a Trauma Center will be decided as soon as possible if the patient meets the Trauma Alert Criteria Appendix 3 or Appendix 4 In these cases, emphasis in pre-hospital care will be on rapid packaging and initiating transport to a Trauma Center. Therefore, on-scene delays should be minimal.
3. Control active hemorrhage with appropriate sterile pressure dressings. Note exact nature and location of blood/fluid loss
   (e.g., ear canals, nostrils, face or scalp wounds).

### A. External Hemorrhage Control

Blood from wounds that damage the large vessels of the extremities are a common source of massive external hemorrhage. The cause of external hemorrhage can be varied depending on the setting in which the injury has taken place. Some of these causes include, but are not limited to, gunshots, stabblings, shrapnel, vehicle accidents and blasts. The identification of life threatening hemorrhage versus non-life threatening hemorrhage is of great importance. The difference between life threatening and non-life threatening exists in the amount of blood loss and patients hemodynamic status.

Massive hemorrhage may be fatal within 60-120 seconds. Treatment should not be delayed and controlling major hemorrhage should be the first priority over securing the airway. Application of tourniquet may be your first option.

**Adult Care**

**EMR/BLS**

Perform a head to toe exam and identify external bleeding.

1. Treat hemorrhage using the following procedures:
   a) Direct pressure
   b) Pressure bandage
   c) Apply tourniquet to extremities with uncontrollable hemorrhaging. Procedure 48
**Note**: Patients who have had a tourniquet applied should be transported to the closest trauma center even if they do not meet trauma alert criteria. The personnel and resources needed to treat this patient are at the Trauma Centers.

2. Treat for shock (compensated shock) aggressively.
3. Maintain body temperature by covering patient with blankets and turning off A/C inside transport unit.

### B. Hypovolemic Shock

**EMR/BLS**

1. Control bleeding as per [Section A. External Hemorrhage Control].
2. Place patient in Trendelenburg Position.
3. Warm patient.

**ALS**

4. Attempt to establish at least two large-bore IV’s.
   a) **Do not delay transport to obtain intravenous access on the Trauma Alert patient.**
5. If the blood pressure is <80mmHg, administer a fluid bolus of 500mL. This may be repeated once until a **minimum systolic BP of 80mmHg** is obtained.

**MCP**

6. Additional fluid boluses above 1L (1000mL).

### C. Suspected Head/Spinal Injury

**EMR/BLS**

1. If history, symptoms, or signs of head or neck injuries are present, manually immobilize the head and neck while assuring airway maintenance per [Airway Management Protocol 7].
2. Spinal Restriction is indicated for patients experiencing signs / symptoms of a possible spinal cord injury subsequent to trauma [Protocol 40].
3. In the absence of hypotension, consider elevating the head of the backboard 30 degrees (12-18”).
4. **Avoid excess administration of Dextrose solutions (D50%, D25%, D5W, etc.) unless hypoglycemia is identified.** Dextrose may increase cerebral edema.
5. Patients with head injury should be ventilated at a rate which will maintain an ETCO₂ of 35-40mmHg. Avoid hyperventilation of the head injury patient.

**ALS**
6. Monitor for signs and symptoms of *intracranial pressure* and/or *Trismus*, manage the airway appropriately as per [Airway Management Protocol 7]. Endotracheal intubation, if indicated, will be accomplished while maintaining in-line stabilization with no hyperextension of the head and neck. Sedation may be required prior to intubation if there is a gag reflex.

7. Intubated patients with head injury should be ventilated at a rate which will maintain an ETCO\textsubscript{2} of 35-40mmHg. Avoid hyperventilation of the intubated head injury patient.

8. If *Neurogenic Shock* is suspected as a result of trauma to the spine, that produces motor and sensory losses below the level of impact on the spine and evidenced by BP < 90 mm Hg systolic, administer fluid challenge of Normal Saline 500 ml and repeat once as needed. If BP is still < 90 mm Hg systolic following fluid challenges and no signs of severe hemorrhage, administer Dopamine 10 mcg/kg/min and titrate to 20 mcg/kg/min as needed. Notify the receiving Trauma Center of possible Neurogenic Shock and treatment.

### D. Soft Tissue Injuries

*General Care*

**EMR/BLS**

1. Do not remove penetrating objects. Such objects may be cut down to six inches from the point of entry to minimize movement. Stabilize the object in place with a bulky dressing and immobilize the extremity (if the object is impaled in an extremity), prior cutting.

2. Open wounds of the cranial vault will be dressed carefully with a sterile dressing, without the use of Betadine or other antiseptic solutions.

3. Any apparent penetrating injuries to the chest, upper back, neck and/or upper abdomen will be covered immediately with an occlusive-type dressing Procedure 6.

4. Penetrating, open injuries of the abdominal cavity will be dressed rapidly and carefully with a sterile gauze dressing; use care not to injure any exposed intra-abdominal organs. Exposed bowel (evisceration) will be dressed with a large trauma dressing previously moistened with sterile saline. This, in turn, will be covered by a dry, occlusive dressing, such as the clear packaging for the large trauma dressing. Do not attempt to put organs back in.

5. Amputations and open fractures will be dressed with a sterile dressing Procedure 28.

6. Soft tissue injuries can be irrigated with Normal Saline. Be cautious with abrasions, a superficial wound caused by the skin rubbed or scraped over a rough surface, examples such as a road rash or mat burns; rubbing, brushing, or washing the wound will cause additional bleeding and pain. After irrigation of skin avulsions, gently fold the skin flap back onto the wound to assist in reperfusion. DO NOT use hydrogen peroxide or iodine / betadine on any open soft tissue injuries / wounds. Cover the wound with a dry, sterile dressing, and apply ice packs to the surrounding area to decrease pain and swelling.

7. Animal bites and human bites can cause soft-tissue injuries, and are treated as such with dry sterile dressings. If there is gross contamination, irrigate the wound with Normal Saline. If the arm or leg is injured, splint the extremity. Consider all such bites as contaminated and potentially infected wounds that may require antibiotics, tetanus prophylaxis, and possibly suturing.
E. Suspected Fractures

General Care

EMR/BLS

1. Any fracture or suspected fracture will be immobilized to reduce the possibility of further injury.
2. Severe angulated fractures may be aligned if there is an absence of distal pulse or neurological function. Distal pulses, skin color, and temperature will be documented prior to and after splinting the angulated fracture.
3. Proximal and distal manual traction may be applied to the injured extremity, as necessary, when applying a splint. The splint should extend, if possible, one joint above and one joint below the fracture site.
4. The use of cold packs is recommended to help reduce swelling. Avoid direct application to exposed skin.
5. Primary care of open fractures involves removal of gross contamination. If protruding contaminated bone ends have been pulled back into the wound, it will be noted in the report. Dress open bone fractures with moist dressing using normal saline.
6. Because of the severe muscle spasm associated with femoral fractures, traction leg splints are to be used to adequately stabilize isolated fractures of the femur. **Do not use the traction splint if a pelvic fracture is suspected.**

F. Trauma in pregnancy

EMR/BLS

1. Adequate maternal oxygenation is essential to assure fetal well-being. Oxygen should be administered via high-flow face mask.
2. Avoid placing the mother in a supine position. After immobilizing the mother on a spine board, slightly elevate the right side of the board.

ALS

3. If signs of shock are present, aggressive fluid resuscitation is indicated refer to [Section B. Hypovolemic Shock].
4. It is important to consider that post-mortem C-section has a high success rate for fetal survival if accomplished as early as possible. Therefore, rapid transport to the appropriate facility is essential.
G. Burn Injuries

General Care

**EMR/BLS**

**Assess the burn:**

1. Determine the type of burn (thermal, chemical, etc.).
2. Determine the area and depth: superficial (1\textsuperscript{st} degree), partial thickness (2\textsuperscript{nd} degree), or full thickness (3\textsuperscript{rd} degree) burns.
3. Determine the TBSA\% injured with the Rule of Nines Appendix 7
4. Determine if the patient was in an enclosed space Protocol 37

**Thermal Burns**

1. Remove rings, bracelets, and other constricting items on extremities.
2. For burns of 1\textsuperscript{st} degree, < 15\% 2\textsuperscript{nd} degree TBSA: cool down area with Normal Saline and/or cold potable water and apply Water-Jel dressings Procedure 43
3. For burns ≥ 15\% 2\textsuperscript{nd} degree or any 3\textsuperscript{rd} degree TBSA: cover area burn with dry sterile dressings and/or sterile sheet.
4. For cold burns: apply dry sterile dressings and/or sterile sheet. Consult with Hazmat if chemically caused, and call MCP for further treatment guidance.
5. When treating significant burns to the fingers, toes, or other surfaces where burned surfaces may contact each other, place bandages between the burned skin areas to prevent the wounds from sticking to each other.
6. Assess for Airway Compromise such as: singed facial or nasal hair, hoarseness, soot, wheezing, and swelling. Treat appropriately and provide oxygen.
8. Keep the patient covered with a blanket.

*Note*: Hot tar is a thermal burn not a chemical burn. Immerse area in cold water to dissipate the heat from the tar and speed the hardening. Once hardened, it will not do further damage. DO NOT remove in the field.

**Chemical Burns**

1. Remove clothing and expose area.
2. Brush off any visible dry chemicals or powder, maintaining proper respiratory precautions to prevent responder exposure.
3. Continuous Normal Saline flush of area, especially if eye involvement.
4. Consult with Hazmat.
Electrical Burns

1. As with Thermal burns, treat as indicated.
2. Search for entrance and an exit wound, where the electrical current may have passed to the ground.
3. Assess for unseen internal injuries.

ALS

1. Manage Airway Compromise appropriately and provide oxygen. Signs of airway burns may lead to edema, and advanced airway management may be indicated.
2. If smoke inhalation, obtain CO levels and treat appropriately for possible carbon monoxide and/or cyanide poisoning. If severe, consider hyperbaric chamber transport.
3. Establish IV access on all patients with second or third degree burns of 15% or greater body surface area or greater than 10% in pediatric patients.
4. Provide Pain Management Protocol 18
5. If signs of shock are present, aggressive fluid resuscitation is indicated refer to Section B. Hypovolemic Shock.
6. Electrical burn patient will require ECG monitoring for possible cardiac abnormalities.

*Note:* The following burns benefit from Burn Center Care and may require advanced specialized burn management, and should be transported to a burn center:

- Patients meeting Burns Trauma Alert Criteria.
- 3rd degree burns.
- Critical Burns: 2nd and 3rd degree burns to the face, eyes, joints, hands, feet, or genitalia; respiratory burns; electrical burns; deep chemical burns; burns with associated major traumatic injury.
- Circumferential burns to extremities that may cause vascular compromise and serious soft tissue swelling.
- Significant inhalation injuries that may require early intubation.
H. Eye Injuries

General Care

**EMR/BLS**

1. Obtain a brief injury history including the mechanism of injury, possible chemical exposure, and allergies.
2. Examine the eye(s) for signs of penetrating injury, foreign body, irritation, hemorrhage, prosthesis, or contact lenses.
3. Remove or ask the patient to remove contact lenses if still in the affected eye(s).
4. Determine gross visual acuity in both eyes. Have the patient read the largest letters on the patient report at arm’s length.
5. If penetrating injury is known or suspected:
   a) Stabilize obvious penetrating objects.
   b) Avoid direct pressure on eye or any maneuvers that might increase intraocular pressure.
   c) Apply ocular shield or similar rigid device over affected eye. Cover both eyes to minimize eye movement.
6. If eyeball has been forced out of the socket, cover the entire eye area with a rigid container, such as a disposable drinking cup. Avoid direct contact with the exposed globe. If bleeding, control by direct pressure with a sterile dry dressing.
7. If there are signs/symptoms or suspicion of ocular exposure to chemicals or foreign body without obvious or suspected penetrating injury or laceration of cornea or globe, irrigate with Normal Saline IV solution.

I. Patient Entrapment

As stated before, in general trauma care the emphasis is on rapid packaging and transport of the patient to achieve definitive care. If transportation of the patient is delayed due to entrapment (motor vehicle collision, structural collapse, confined space environments, or trench collapse), the patient must be treated appropriately while technical rescue operations are under way to free the patient.

**EMR/BLS**

1. Don the appropriate protective gear for the environment.
2. Stabilize the scene.
3. Gain access to the patient.
4. Protect the patient from further harm.
5. In cases where spinal injury is suspected, provide immobilization by manual means initially. The environment may require special patient packaging equipment (Stokes Basket, KED, SKED, LSP-Halfback, or a Miller Board). Patient packaging and extrication should be coordinated with the Extrication Sector.
ALS

6. Obtain vascular access as needed. If peripheral access is limited, external jugular access should be considered.

7. If signs of shock are present, aggressive fluid resuscitation is indicated refer to Section B. Hypovolemic Shock.

8. If signs of Traumatic Asphyxia, refer to Section K. Traumatic Asphyxia.

9. If signs of Crush Injuries, refer to Section J. Crush Injuries.

MCP

10. Consider a field blood transfusion for extended extrications Protocol 41

J. Reperfusion (Crush) Injury

If the patient’s extremity or extremities have been trapped for 60 minutes or more by a heavy object occluding peripheral perfusion, the patient must be treated to prevent reperfusion injury. Crush injury is to be distinguished from a simple entrapment. This treatment must be administered prior to the object being lifted from the patient.

Adult Care

EMR/BLS

1. Manage the airway appropriately and provide oxygen.

2. For hemorrhage control, refer to Section A. External Hemorrhage Control, and the possibility of the use of a tourniquet.

ALS

3. Obtain vascular access as needed. If peripheral access is limited, external jugular access should be considered.

4. Infuse 50mEq of Sodium Bicarbonate with a 1000mL bag of Normal Saline, and run wide open.

5. Provide cardiac monitoring when possible, in case of dysrhythmias and treat appropriately.

MCP

6. If Field amputation is required, refer to Protocol 31
K. Traumatic Asphyxia

Traumatic injuries that suddenly and forcefully compress the thoracic cavity, like an unrestrained driver hitting a steering wheel or a pedestrian, who is compressed between a vehicle and a wall, may induce traumatic asphyxia. The sudden compression of the chest causes a massive increase in pressure translated into the major veins of the head, neck and kidneys. The pressure increase then passes into the capillary beds, resulting in their rupture. Physical findings are characterized by cyanosis of the head, upper extremities, and the torso above the level of the compression. Ocular hemorrhage may be mild (subconjunctival hematoma) or extremely dramatic causing the eyes to protrude from their normal position (exophthalmos).

Adult Care

**EMR/BLS**

1. Take cervical spine precautions.
2. Manage the airway appropriately and provide oxygen.

**ALS**

1. Obtain vascular access as needed. If peripheral access is limited, external jugular access should be considered.
2. Monitor and manage any life-threatening injuries as a result of chest trauma such as pneumothorax.
3. If patient’s chest remains compressed for a prolonged time more than 20 minutes, consider administration of 50 mEq of Sodium Bicarbonate IV/IO, just before or during the removal of the entrapment.
4. Provide cardiac monitoring for dysrhythmias due to chest trauma, such as a possibility of complications due to myocardial contusions, myocardial rupture, or cardiac tamponade. Treat dysrhythmias appropriately.