

This protocol is designed to focus on patient care not covered in the Initial Assessment/Care [Protocol 1P](#) 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. If on scene times are greater than 10 minutes, the reason for delay must be documented on the ePCR narrative.**

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

- A. [Hemorrhage Control](#)
- B. [Penetrating Wounds to the Torso](#)
- C. [Hemorrhagic Shock](#)
- D. [Suspected Head/Spinal Injury](#)
- E. [Epistaxis \(Nose Bleed\)](#)
- F. [Soft Tissue Injuries](#)
- G. [Suspected Fractures](#)
- H. [Burn Injuries](#)
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- J. [Reperfusion \(Crush\) Injury](#)
- K. [Traumatic Asphyxia](#)

General Care

EMR/BLS

1. Initial Assessment/Care [Protocol 1P](#).
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 and vascular access attempts shall not delay transport.
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).
4. Administer oxygen and provide Airway Management [Protocol 7P](#) as necessary.
5. Maintain body temperature by covering patient with blankets or a thermal mylar blanket, when available and consider turning off A/C unit in the patient compartment during transport.

ALS

6. Establish peripheral vascular access as necessary [Procedure 13](#).
7. Fluids should be administered as necessary to maintain peripheral pulses (maintaining a SBP of 80-90 mmHg) and may be repeated as necessary, for [age-appropriate hypotension](#).

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A. 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, stabbings, 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.

Pediatric Care

EMR/BLS

1. Perform a rapid trauma head-to-toe exam and identify external bleeding.
2. Treat hemorrhage using the following procedures:
 - a) Assess and find the source of bleeding.
 - b) Apply direct pressure on the wound.
3. To control life-threatening external hemorrhage from an arm or leg apply a tourniquet [Procedure 48](#) or an appropriate pressure dressing. Deep wound packing with hemostatic gauze and/or plain gauze [Procedure 9](#) may also be indicated.
4. To control life-threatening bleeding from junctional areas (neck, shoulder or groin), Pack the wound with hemostatic gauze and/or plain rolled gauze [Procedure 9](#).
5. For any partial or complete amputation, a tourniquet should be applied regardless of bleeding. Amputations and open fractures will be dressed with a sterile dressing [Procedure 28](#). Amputated part(s) should be managed appropriately and transported with patient.
6. If patient is hypotensive, place patient in the Trendelenburg's position.
7. Treat for shock (compensated shock) aggressively.
8. Maintain body temperature by covering patient with blankets or a thermal mylar blanket, when available and consider turning off A/C unit in the patient compartment during transport.

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9. Attempt to establish at least two large-bore IVs.

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- a) **Do not delay transport to obtain intravenous access on the Trauma Alert patient.**
 - b) **If vascular access is not quickly obtainable via the IV route, establish IO access.**
10. If signs or symptoms suggest shock, for [age-appropriate hypotension](#), infuse **fluid bolus 20 mL/kg IV of Normal Saline** and reassess the patient. If there is no improvement in the cardiovascular status, additional boluses may be repeated in 20 mL/kg increments up to a total bolus of 60 mL/kg.
- a) Monitor patient's blood pressure and lung sounds often.
11. If the patient meets Trauma Alert Criteria with torso injuries and/or amputation(s) with severe bleeding not controlled by tourniquet that results in signs or symptoms suggest shock, for [age-appropriate hypotension](#) consider the administration of **Tranexamic Acid (TXA) 15 mg/kg over 10 minutes** by IV infusion as soon as possible, within the first hour after injury.
- *Note – Not indicated for pediatrics less than 5 years old.**
12. The Trauma Center **must** be notified that **15 mg/kg of TXA** has been administered.

B. Penetrating Wounds to the Torso

Pediatric Care

EMR/BLS

13. Do not remove penetrating objects, unless through the cheek causing airway obstruction or in the chest and interfering with CPR.
 - a) Such objects may be cut down to six inches from the point of entry to minimize movement.
 - b) Stabilize the object in place with bulky dressings.
14. 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](#).
15. Monitor the patient with penetrating torso trauma for the development of a possible tension pneumothorax. Non-invasive decompression can be performed by removing the occlusive dressing and physically “burping” the chest seal, and re-apply.
16. Penetrating, open injuries of the abdominal cavity will be dressed rapidly and carefully with a sterile gauze dressing (e.g. Multi-Trauma dressing) [Procedure 6](#).
 - a) Use care not to injure any exposed intra-abdominal organs. Exposed bowel (evisceration) will be dressed with a dressing previously moistened with sterile saline. This, in turn, will be covered by a dry, occlusive dressing, such as plastic packaging or foil. **Do not attempt to put organs back in.**

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17. Attempt to establish at least two large-bore IVs.
 - c) **Do not delay transport to obtain intravenous access on the Trauma Alert patient.**
 - d) **If vascular access is not quickly obtainable via the IV route, establish IO access.**
18. If tension pneumothorax develops, perform chest needle decompression [Procedure 5](#).
19. If signs or symptoms suggest shock, for [age-appropriate hypotension](#), infuse **fluid bolus 20 mL/kg IV of Normal Saline** and reassess the patient. If there is no improvement in the cardiovascular status, additional boluses may be repeated in 20 mL/kg increments up to a total bolus of 60 mL/kg.
 - a) Monitor patient's blood pressure and lung sounds often.
20. If the patient meets Trauma Alert Criteria with torso injuries and/or amputation(s) with severe bleeding not controlled by tourniquet that results in signs or symptoms suggest shock, for [age-appropriate hypotension](#) consider the administration of **Tranexamic Acid (TXA) 15 mg/kg over 10 minutes** by IV infusion as soon as possible, within the first hour after injury.

***Note – Not indicated for pediatrics less than 5 years old.**
21. The Trauma Center **must** be notified that **15 mg/kg of TXA** has been administered.
22. 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.

C. Hemorrhagic Shock

Pediatric Care

ALS

1. In cases of suspected hypovolemic shock, attempt to establish at least two large-bore IVs with the largest applicable catheter.
2. If signs or symptoms suggest shock, for [age-appropriate hypotension](#), infuse **fluid bolus 20 mL/kg IV of Normal Saline** and reassess the patient. If there is no improvement in the cardiovascular status, additional boluses may be repeated in 20 mL/kg increments up to a total bolus of 60 mL/kg.
 - a) Monitor patient's blood pressure and lung sounds often.

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3. Additional fluid boluses above 60 mL/kg.

D. Suspected Head/Spinal Injury

General Care

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 7P](#).
2. Immobilization of the entire spine is necessary to prevent potentially life-threatening or further disabling injuries during the movement and transportation of the trauma victim [Protocol 40](#). Indications for immobilization include:
 - a) **Physical findings:**
 - a) Pain to or pain on movement of the neck or back.
 - b) Point tenderness, deformity, and/or guarding of the spine area.
 - c) Paralysis, paresis, numbness, or tingling in the arms or legs at any time post-insult.
 - d) Signs or symptoms of neurogenic shock.
 - e) Unconsciousness with unknown cause.
 - f) Possible injury to the spine when evaluation is difficult due to altered mental status.
 - g) Significant injuries above the clavicles.
 - b) **Mechanism of injury:**
 - a) Any mechanism that impacts violently on the head, neck, torso, or pelvis, associated with sudden violent movement of the spine.
 - b) Incidents producing sudden acceleration, deceleration, or lateral bending (commonly occurring in motor vehicle collisions).
 - c) Falls from a significant height.
 - d) Any unrestrained victims in a vehicular rollover or persons ejected from a moving vehicle.
 - e) Penetrating wounds to the head, neck, chest, back, or pelvis.

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- f) Other significant injuries and/or significant mechanisms of injury (i.e.- electrocution, explosion, lightning, shallow water dive).
3. In the absence of hypotension, consider elevating the head of the backboard 30 degrees (12-18").
4. It is critical to prevent hypotension and hypoxia in management of Traumatic Brain Injury (TBI).
 - a) Patients with head injury should be ventilated at a rate of no greater than 1 breath every 3 seconds (20 breaths/min.) which will **maintain an ET_{CO}₂ of 35-40mmHg** and should be maintained with oxygen saturation > 90%. Avoid hyperventilation of the head injury patient.
 - b) If Neurogenic Shock (*warm/dry skin (particularly below the area of the injury), hypotension with a heart rate WNL, paralysis*) is suspected as a result of trauma to the spine, elevate the foot end of the spine board slightly, placing the patient's arms across the chest without moving the spine. Monitor the patient's breathing, lowering the spine board if there is an onset of breathing problems. Provide assisted ventilations if respirations are weak or inadequate.
5. **Avoid excess administration of Dextrose solutions (D50%, D25%, D10%, D5W, etc.) unless hypoglycemia is identified.** Dextrose may increase cerebral edema.
6. Open wounds of the cranial vault will be dressed carefully with a sterile dressing **without** the use of Betadine or other antiseptic solutions.
7. Blood from the ear after a head injury may be a sign of a skull fracture.
 - a) Assess blood or drainage from the ear with a 4x4 dressing, and let it sit for about a minute.
 - b) If a characteristic staining of the dressing appears like a target or halo (blood stain in the middle), cerebrospinal fluid may be draining from the ear. Cover the bleeding site with sterile gauze pad, and apply light compression by loosely wrapping the dressing around the head.

ALS

8. Monitor for signs and symptoms of *intracranial pressure (e.g. irregular respirations, bradycardia, and hypertension)* and/or *Trismus (clenched teeth)*, manage the airway appropriately as per [Protocol 7P](#).
 - a) Endotracheal intubation, if indicated, will be accomplished while maintaining in-line stabilization with no hyperextension of the head and neck.
9. Attempt to establish at least two large-bore IVs.
 - a) **Do not delay transport to obtain intravenous access on the Trauma Alert patient.**
 - b) **If vascular access is not quickly obtainable via the IV route, establish IO access.**

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10. If Neurogenic Shock (warm/dry skin (particularly below the area of the injury), hypotension with a heart rate WNL, paralysis) is suspected as a result of trauma to the spine and remains hypotensive, age appropriate. Notify the receiving Trauma Center of possible Neurogenic Shock and treatment.
 - a) **Infuse fluid bolus 20 mL/kg IV of Normal Saline** and reassess the patient. If there is no improvement in the cardiovascular status, additional boluses may be repeated in 20 mL/kg increments up to a total bolus of 60 mL/kg.
 - i. Monitor patient's blood pressure and lung sounds often.

E. Epistaxis (Nose Bleed)

Pediatric Care

EMR/BLS

1. Position the patient leaning forward and sitting.
2. Apply direct pressure by pinching the nostrils together.
3. Apply a cold pack over the bridge of the nose.
4. Continue pinching the nose until the bleeding stops.
5. An alternative method if a cold pack is not available or if not tolerated by the patient, is to apply pressure using a rolled gauze bandage between the upper lip and gum.

F. Soft Tissue Injuries

General Care

BLS

1. Soft Tissue injuries can be irrigated with Normal Saline.
2. Be cautious with abrasions:
 - a) 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.
 - b) After irrigation of skin avulsions, gently fold the skin flap back onto the wound to assist in reperfusion.
 - c) DO NOT use hydrogen peroxide or iodine/betadine on any open soft tissue injuries/wounds.
 - d) Cover the wound with a dry sterile dressing and apply cold packs to the surrounding area to decrease pain and swelling.

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3. Animal bites and human bites can cause soft tissue injuries and are treated as such with dry sterile dressings.
 - a) If there is gross contamination, irrigate the wound with Normal Saline.
 - b) If the arm or leg is injured, splint the extremity.
 - c) Consider all such bites as contaminated and potentially infected wounds that may require antibiotics, tetanus prophylaxis, and possibly suturing.
4. Amputations and open fractures will be dressed with a sterile dressing [Procedure 28](#).

G. 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 once, 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 stabilization 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 or knee/ankle injury is suspected.**

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7. Attempt to establish an IV.
 - a) **Do not delay transport to obtain intravenous access on the Trauma Alert patient.**
 - b) **If vascular access is not quickly obtainable via the IV route, establish IO access.**

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8. If the injury is an isolated extremity injury, with no hypotension or respiratory distress, provide Pain Management [Protocol 18P](#).
9. If signs or symptoms suggest shock, for [age-appropriate hypotension](#), infuse **fluid bolus 20 mL/kg IV of Normal Saline** and reassess the patient. If there is no improvement in the cardiovascular status, additional boluses may be repeated in 20 mL/kg increments up to a total bolus of 60 mL/kg.
 - a) Monitor patient's blood pressure and lung sounds often.

H. Burn Injuries

General Care

EMR/BLS

1. Assess the burn:
 - a) Determine the type of burn (thermal, chemical, etc.).
 - b) Determine the area and depth: superficial (1st degree), partial thickness (2nd degree), or full thickness (3rd degree) burns.
 - c) Determine the TBSA% injured with the Rule of Nines [Appendix 7](#).
 - d) Determine if the patient was in an enclosed space [Protocol 37P](#).
 - e) Perform Airway Management [Protocol 7P](#) as necessary and administer oxygen.

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
- 2nd degree (partial-thickness) burns > 10% TBSA
- 3rd degree (full-thickness) burns in any age group
- Burns involving the face, eyes, hands, feet, genitalia, perineum, and/or major joints
- Respiratory burns, inhalation injury
- Electrical burns, including lightning injury
- Chemical burns
- Burns with associated major traumatic injury

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- Circumferential burns to extremities that may cause vascular compromise and serious soft tissue swelling
- Any patient with burns and concomitant trauma (e.g. fractures) in which the burn injury poses the greatest risk of morbidity or mortality
- Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality

ALS

2. If smoke inhalation, obtain CO levels [Procedure 44](#) and treat appropriately for possible carbon monoxide and/or cyanide poisoning.
3. Establish IV access on all patients with second or third degree burns of 10% or greater body surface area. Attempt to establish at least two large-bore IVs.
 - a) **Do not delay transport to obtain intravenous access on the Trauma Alert patient.**
 - b) **If vascular access is not quickly obtainable via the IV route on the critical patient, establish IO access.**
4. Provide Pain Management [Protocol 18P](#).
5. Electrical burn patients will require ECG monitoring for possible cardiac abnormalities.

Types of Burns

Pediatric Care

1. Thermal Burns

EMR/BLS

1. Cover areas of burn with dry sterile dressings and/or wrap patient in a sterile sheet or burn blanket to provide a warm environment.
2. Cover patient with a blanket or thermal mylar blanket, when available to maintain thermal regulation.
3. Cold (cryogenic) burns:
 - a) Apply dry sterile dressings and/or sterile sheet.
 - b) Consult with HazMat if chemically induced, and contact MCP for further treatment guidance.

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4. When treating significant burns to the fingers, toes, or other surfaces where surfaces burned may contact each other.
 - a) Place bandages between the burned skin areas to prevent the wounds from sticking to each other.
5. Assess for Airway Compromise such as:
 - a) Singed facial or nasal hair, hoarseness, soot, wheezing, and swelling.
 - b) Treat appropriately and administer oxygen.
6. Begin fluid resuscitation for burns $\geq 15\%$ TBSA with **Normal Saline** at:
 - a) Ages 14 years old or >: 80 gtts/min. with a 10 drop (macro) set.
 - i. Recommended pre-hospital fluid resuscitation rate of 500 mL/hour.
 - b) Pediatrics (1 year to 14 years): 40 gtts/min. with a 10 drop (macro) set.
 - i. Recommended pre-hospital fluid resuscitation rate of 250 mL/hour.
 - c) Infants (1 month to 1 year): 20 gtts/min. with a 10 drop (macro) set.
 - i. Recommended pre-hospital fluid resuscitation rate of 125 mL/hour.
7. Monitor for shock and treat appropriately.

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 process of hardening. Once hardened, it will not do further damage. **DO NOT** remove in the field.

2. Chemical Burns

Pediatric Care

EMR/BLS

1. Remove clothing and expose area.
2. Brush off any visible dry chemicals or powder, maintaining proper respiratory precautions to prevent responder exposure.
3. Continuously flush area with Normal Saline or copious amounts of potable water.
 - a) If there is eye involvement, ensure to flush with eyes copiously.
4. Consult with HazMat.

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3. Electrical Burns

Pediatric Care

EMR/BLS

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.

I. **Eye Injuries**

General Care

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, if possible.
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:
 - a) Cover the entire eye area with a rigid container, such as a disposable drinking cup. Avoid direct contact with the exposed globe.

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- b) 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:
- a) Irrigate with Normal Saline IV solution.

J. Reperfusion (Crush) Injury

If the patient's extremity or extremities have been trapped for an extended period of time greater than 60 minutes 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.

Pediatric Care

EMR/BLS

Sodium Bicarbonate 8.4% - Reperfusion (Crush) Injury								
1yr	2yr	3yr	4yr	5yr	6yr	7yr	8yr	9yr
10 mL	12 mL	15 mL	17 mL	20 mL	22 mL	25 mL	27 mL	30 mL

1. Manage the airway appropriately and administer oxygen.

ALS

2. Infuse **40 mL/kg bolus (maximum bolus of 1000 mL) of Normal Saline**. Simultaneously administer **1 mEq/kg (maximum 50 mEq) of Sodium Bicarbonate IV**.

Normal Saline Bolus - Reperfusion (Crush) Injury								
1yr	2yr	3yr	4yr	5yr	6yr	7yr	8yr	9yr
400 mL	480 mL	600 mL	680 mL	800 mL	880 mL	1000 mL	1000 mL	1000 mL

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

MCP

4. If Field Amputation is required, refer to [Procedure 16](#).

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 increases 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).

Pediatric Care

EMR/BLS

1. Take cervical spine precautions and perform spinal motion restriction as necessary.
2. Manage the airway appropriately and administer oxygen.
 - a) Support ventilations with BVM.

ALS

3. Obtain vascular access as needed [Procedure 13](#). If peripheral access is limited, external jugular access should be considered.
4. Monitor and manage any life-threatening injuries as a result of chest trauma such as pneumothorax.
5. Provide cardiac monitoring for dysrhythmias due to chest trauma. Treat dysrhythmias appropriately.