

**PEDIATRIC
TRAUMA
EMERGENCIES**

Last Revised: January 2015

PEDIATRIC COMA SCALE

Indicator	Child	Score	Infant	Score
Eye Opening	Spontaneous	4	Spontaneous	4
	To verbal stimuli	3	To verbal stimuli	3
	To pain only	2	To pain only	2
	No response	1	No response	1
Verbal Response	Oriented, appropriate	5	Coos and babbles	5
	Confused	4	Irritable cries	4
	Inappropriate	3	Cries to pain	3
	Incomprehensible	2	Moans to pain	2
	No response	1	No response	1
Motor Response*	Obeys commands	6	Moves spontaneously	6
	Localizes pain	5	Withdraws to touch	5
	Withdraws from pain	4	Withdraws to pain	4
	Flexion to pain	3	Decorticate posturing	3
	Extension to pain	2	Decerebrate posturing	2
	No response	1	No response	1

Total PCS: _____

***If the patient is intubated, unconscious or preverbal, the most important part of this score is motor response. This section should be carefully evaluated.**

INITIAL TRAUMA CARE

NOTE: Appropriate body substance isolation precautions must be used.

FR/BLS TREATMENT:

1. Assure scene is safe.
 2. Control C-spine
 3. Perform a trauma (ITLS) primary patient assessment.
 4. Control any major external bleeding. Consider the need for a tourniquet.
 5. Administer OXYGEN by appropriate method when indicated and attempt to maintain oxygen saturation at 94-99%.
 6. If patient has inadequate ventilation or respiratory effort refer to the Region Six UNIVERSAL AIRWAY ALGORITHM.
 7. Apply spinal motion restriction (immobilization) as indicated.
 8. If patient meets category A or B criteria from the Region 6 Trauma Triage Algorithm:
 - a. Transport rapidly** and call for intercept per INTERCEPT CRITERIA.
Appropriate patient destination should be determined by the Region 6 Trauma Triage Algorithm.
 - b. Perform a secondary (detailed) survey if patient is packaged and ambulance has not arrived or during transport.
 - c. Scene time should be limited to 10 minutes or less, unless entrapment exists.
 9. If category A or B criteria from the Region 6 Trauma Triage Algorithm is not present:
 - a. Continue with the secondary survey and provide supportive care.
 - b. Transport** and call for intercept per INTERCEPT CRITERIA.
 10. Reassess frequently; every 5 minutes for unstable patients and every 15 minutes for stable patients.
 11. Contact Medical Control.
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT**.
 2. Perform trauma (ITLS) primary patient assessment.
 3. Consider the need for advanced airway; refer to the Region Six UNIVERSAL AIRWAY ALGORITHM.
 4. Obtain vascular access if needed. Do not delay transport to obtain vascular access.
 5. Apply cardiac monitor if needed.
 6. Assess for treatable causes of shock and treat according to the appropriate protocol.
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**** Only if transporting agency.**

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Direct Trauma Transport Triage Criteria

Purpose: To define patients who need rapid transport to a trauma or specialty center.

Policy: Any patient meeting the criteria below should strongly recommend transport directly to the facility most capable of meeting their needs as defined by the criteria groupings or algorithm. If prolonged scene time or transport is anticipated, refer to “Use of Aeromedical Transport Vehicles” policy. Contact the Resource Hospital for direction as soon as possible if questions exist regarding a specific patient or situation.

Patients meeting criteria A or B: Initiate rapid transport with scene time no greater than 10 minutes.

Airway compromise or management by a Basic level EMS provider without ALS intercept should be transported to the nearest facility.

Criteria:

1. Presence of any of the following should strongly recommend direct transport to a Level I trauma or specialty center capable of immediate surgery / targeted invasive intervention:
 - a. Sustained hypotension (Adult ≤ 90 mmHg; Peds ≤ 80 mmHg) with mechanism or exam findings suggesting ongoing blood loss
 - b. GCS (Glasgow Coma Scale) 10 or less
 - c. GSW to the abdomen, back, chest or neck with suspicion of significant injury
 - d. Stab wound to the abdomen, back, chest or neck with suspicion of significant injury
 - e. Uncontrolled bleeding
 - f. Pulseless extremity
 - g. Unstable pelvis fracture (hemodynamically or anatomically unstable)
 - h. Paralysis (spinal cord injury)
 - i. Burns, 2nd or 3rd degree $>24\%$ TBSA or involving face / airway not meeting other Category A criteria (Direct to Burn Center)
 - j. Amputation proximal to wrist or ankle not meeting other Category A criteria (direct to Re-Implant Center)
 - k. Cardiac Tamponade / Tension Pneumothorax
2. Presence of any of the following should strongly recommend transport to a hospital capable of urgent surgery:
 - a. Respiratory Rate <10 or >29
 - b. GCS (Glasgow Coma Scale) 11 – 12 and loss of consciousness > 5 minutes
 - c. Full arrest not meeting Region 6 Field Death Declaration Criteria
 - d. Stabbing or Gunshot wound to abdomen, back, chest or neck (stable)
 - e. Flail chest / Chest wall instability
 - f. Head injury with seizure activity, unilaterally dilated pupil, or open / depressed skull fracture
 - g. Two or more proximal long bone fractures
 - h. MVC (motor vehicle crash) with ejection

- i. Death of occupant in same passenger compartment
- j. Falls ≥ 20 ft (Children: >10 ft or 2- 3 x height of the child)
- k. Separation of rider from motorcycle
- l. Pedestrian / bicyclist struck by vehicle and thrown or run over
- m. Vehicle rollover with unbelted passengers

Treatment:

1. BLS and ILS units should activate a tiered response or aeromedical transport to gain ALS level skills for the patient if they anticipate prolonged scene or transport time.
2. BLS units without mutual aid / rapid tiered response option should transport the patient to the nearest local hospital.
3. Consider aeromedical transport if quicker and of clinical benefit.
4. Pre-determined landing zones should be utilized whenever feasible for patient handoff to aeromedical teams. The landing zones should be available to all aeromedical transport agencies.

Region 6 Trauma Triage Algorithm

When in doubt, take patient to an appropriate Trauma Center.

Measure signs and level of consciousness and assess for major injury.

For Patients Meeting Category A or B Criteria: Initiate Rapid Transport with Maximum of 10 Minute Scene Time

Airway Compromise or Management by a Basic Level EMS Provider without Mutual Aid Should be Transported to the Nearest Facility

Category A:

- GCS Less than or equal to 10
- Systolic BP less than 90 (Adult), 80 (Peds) with mechanism or exam findings suggesting ongoing blood loss
- Paralysis (spine)
- Uncontrolled Bleeding
- Penetrating injuries to abdomen, back, chest or neck and suspicion of significant injury
- Burns >24% surface area, or involving face/airway not meeting other Category A criteria (Direct to Burn Center)
- Salvageable amputation proximal to wrist or ankle not meeting other Category A criteria (Direct To Reimplant Center)
- Unstable Pelvic Fracture
- Pulseless Extremity
- Cardiac Tamponade or Tension Pneumothorax

YES

STRONGLY RECOMMEND:
Transport to Level I Trauma Center or
Specialty Center per Protocol

Alert Trauma Team; Consider Helicopter
Transport if Quicker and of Clinical Benefit.

NO:
Assess for other injuries.

Category B:

- LOC greater than 5 minutes and GCS 11-12
 - Respiratory rate less than 10 or greater than 29
 - Head injury with seizure activity, unilaterally dilated pupil or open/depressed skull fracture
 - Full arrest not meeting Field Death Criteria
 - Penetrating injuries with capability to work up/correct
- High Risk Vehicular Crash:
- *Rollover with unbelted passengers
 - *Ejection from crash
 - *Death in same passenger compartment
 - *Auto v. pedestrian/bicyclist thrown or run over
 - *Motorcycle crash with separation of rider and bike.
- Falls greater than 20 ft or 2-3 times patient's height if child
 - Flail Chest/Chest wall instability
 - Two or more proximal long bone fractures

YES

STRONGLY RECOMMEND:
Transport to center capable of providing
definitive care (surgery if needed); alert
trauma team; consider helicopter transport
if quicker and of clinical benefit.

NO

Transport According to Trauma
Protocols

AMPUTATION

NOTE: Do not delay transport of patient to retrieve an entrapped or lost part.
Do not complete partial amputations.

FR/BLS TREATMENT:

1. **INITIAL TRAUMA CARE.**
 2. Treat for shock if indicated.
 3. Tissue preservation:
 - a. Rinse part gently with normal saline if gross contamination (**DO NOT SCRUB**).
 - b. Wrap part in moist sterile gauze (part should never be immersed in water).
 - c. Place wrapped part in water tight bag and seal.
 - d. Label bag with name, date and time.
 - e. Place sealed bag into container filled with water and ice and transport with patient. (**DO NOT PLACE DIRECTLY ON ICE**)
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT**.
 2. **DO NOT** delay transport to obtain vascular access.
 3. Consider **MORPHINE SULFATE** or **FENTANYL** as needed for pain control:
 - a. **MORPHINE SULFATE** 0.1 mg/kg slow IVP (max. single dose 5 mg) or 0.2 mg/kg IM (max. dose 10 mg). May repeat IVP dose x 1 after 15 minutes if needed.
 - b. **FENTANYL**:
IV – 1 mcg/kg slow IVP (maximum initial dose 100 mcg); may repeat x 1 after 15 minutes at 0.5 mcg/kg (maximum second dose 50 mcg).
IM – 2 mcg/kg (maximum dose 100 mcg).
IN – 1 mcg/kg via atomizer*(maximum initial dose 50 mcg); may repeat x 1 after 5 minutes at 0.5 mcg/kg (maximum second dose 25 mcg).
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***Intranasal medications must be administered through an atomizer; Maximum volume per nostril = 1 ml.**

**Revised: November 2013
July 2014
January 2015**

BURNS

NOTE: Use palm of child's hand to represent 1% of body surface area. All burns in pediatric patients should be assessed for abuse potential.

CRITERIA: Any may be present:

1. Inhalation injury.
2. Electrical injury.
3. Significant partial or full thickness burns.
4. Chemical injury.

FR/BLS TREATMENT:

1. Assure scene and rescuer safety; remove patient from source of burn.
 2. **INITIAL TRAUMA CARE.**
 3. Obtain burn history:
 - a. Type of burn / causative agent / time of burn.
 - b. Location of burn / Injury environment
 - c. Estimate degree and percent of surface area burned (Use palm of patients hand to represent 1% of body surface area.)
 4. Assess and treat burn according to type:
 - a. Superficial thermal burns: Cool with sterile water or saline then cover with moist sterile dressings.
 - b. Partial and full thickness thermal burns: Cover burns with DRY sterile dressings.
 - c. Chemical burns: Flush with water or saline (brush off dry chemical first).
 - d. Electrical burns: Note any secondary fractures or exit wounds caused by the current.
 5. Call for intercept per INTERCEPT CRITERIA.
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
 2. Consider the need for an advanced airway if signs of inhalation injury are present.
 3. Administer 20 ml/kg NS or LR fluid bolus to maintain adequate perfusion. May repeat to total of 60 ml/kg.
 4. Consider **MORPHINE SULFATE** or **FENTANYL** as needed for pain control:
 - a. **MORPHINE SULFATE** 0.1 mg/kg slow IVP (max. single dose 5 mg) or 0.2 mg/kg IM (max. dose 10 mg). May repeat IVP dose x 1 after 15 minutes if needed.
 - b. **FENTANYL:**
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IM – 2 mcg/kg (maximum dose 100 mcg).
IN – 1 mcg/kg via atomizer*(maximum initial dose 50 mcg); may repeat x 1 after 5 minutes at 0.5 mcg/kg (maximum second dose 25 mcg).
 5. Treat any dysrhythmias per appropriate protocol.
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CHEST INJURIES

CRITERIA: Any may be present:

1. Penetrating or sucking chest wounds.
2. Unstable chest wall segment.
3. Signs of blunt trauma to chest.
4. Paradoxical movement.
5. Tachypnea or respiratory distress with suspected chest injury.

FR/BLS TREATMENT:

1. **INITIAL TRAUMA CARE.**
 2. Treat any obvious chest injuries, as indicated:
 - a. Apply occlusive dressing to sucking chest wounds, leaving one corner open.
 - b. Support any unstable chest wall segments with bulky dressings or hand.
 - c. Control bleeding.
 3. Call for intercept per INTERCEPT CRITERIA.
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
 2. NS KVO or saline lock.
 3. Consider the need for a needle decompression:
 - a. Signs of shock
 - b. Decreased or absent breath sounds on affected side.
 - c. Tracheal deviation. (late sign)
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HEAD OR SPINE TRAUMA

CRITERIA: Any may be present:

1. Unresponsive or $GCS \leq 13$.
2. Posturing.
3. Unequal pupils.
4. Loss of motor and/ or sensory function.
5. Mechanism that indicates significant potential for injury.

EXCLUSION:

1. SBP < 90 – See SHOCK FROM TRAUMA protocol.

FR/BLS TREATMENT:

1. **INITIAL TRAUMA CARE.**
 2. Assessment factors to consider:
 - a. Restlessness can be a sign of hypoxia.
 - b. Assume cervical injury in all patients with significant head injury.
 - c. Observe patient closely for changes in LOC.
 - d. Avoid the use of nasal airways with suspected facial fractures.
 - e. Do not treat hypertension in the head-injured patient.
 3. Call for intercept per INTERCEPT CRITERIA.
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
 2. If unconscious or semi-conscious, manage airway according to the UNIVERSAL AIRWAY ALGORITHM; if signs of elevated intracranial pressure (posturing, unilateral pupil dilation, $GCS \leq 8$ with hypertension/bradycardia), initiate mild hyperventilation (4 ventilations above normal rate) with 100% oxygen keeping end-tidal pCO₂ at 33-35% if able to monitor.
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PAINFUL, SWOLLEN, DEFORMED EXTREMITY

CRITERIA: Any may be present:

1. Obvious open fracture
2. Dislocation
3. Deformity
4. Swelling
5. Point tenderness
6. History of injury consistent with a fracture.

FR/BLS TREATMENT:

1. **INITIAL TRAUMA CARE.**
 2. Evaluate PMS (pulse, movement and sensation) distal to the injury.
 3. Immobilize fracture, covering open wounds with sterile gauze.
 4. Reassess PMS distal to the injury.
 5. Call for intercept per INTERCEPT CRITERIA.
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ILS/ALS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
 2. Consider **MORPHINE SULFATE** **or** **FENTANYL** as needed for pain control:
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 - b. **FENTANYL:**
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SHOCK FROM TRAUMA

CRITERIA: Any may be present:

1. Systemic hypotension
2. Altered LOC
3. Inadequate perfusion (pale, cool & mottled)
4. Massive blood loss
5. Crush Syndrome
6. Suspected pelvis or long bone fractures

FR/BLS TREATMENT:

1. **INITIAL TRAUMA CARE.**
 2. If suspected pelvic fracture consider pelvic wrap.
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ILS TREATMENT:

1. Continue **FR/BLS TREATMENT.**
 2. Administer 20 ml/kg NS or LR fluid bolus to maintain adequate perfusion. May repeat fluid bolus to a maximum of 60 ml/kg.
 3. Consider the potential cause for shock:
 - a. Tension Pneumothorax - Needle decompression
 - b. Hemorrhage - Control bleeding, IV fluids
-

ALS TREATMENT:

1. Continue **ILS TREATMENT.**
 2. Consider the potential cause for shock:
 - a. Tension Pneumothorax - Needle decompression
 - b. Hemorrhage - Control bleeding, IV fluids
 - c. Pericardial tamponade – Pericardiocentesis (*as per Pericardiocentesis Care Guideline with Medical Control order only.*)
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3. If neurogenic shock is suspected and patient is not responsive to fluid bolus, Medical Control may consider DOPAMINE at 1 gtt/5 kg/minute titrated to desired blood pressure.

TRAUMATIC ARREST

FR/BLS TREATMENT:

1. Initiate CPR.
 2. Initial TRAUMA CARE.
 3. Attempt to maintain inline stabilization throughout assessment and treatment.
 4. Rapid extrication should be utilized if patient is entrapped.
 5. Apply AED.
 6. Load and Go within **10 minutes** unless patient is entrapped.
 7. Initiate transport. ** Call for intercept per INTERCEPT CRITERIA.
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ILS TREATMENT:

1. Continue **FR/BLS TREATMENT**.
2. EPINEPHRINE (1:10,000) 0.01mg/kg IV/IO q 3-5 minutes as long as patient remains pulseless.*
3. Initiate 2 large bore IV's of NS or LR; Run wide open until patient regains pulse. If a pulse returns then maintain a SBP of 90-100.
4. Treat subsequent dysrhythmias per appropriate protocol.
- a. -----

ALS TREATMENT:

1. Continue ILS TREATMENT.
 2. Assess for signs of pericardial tamponade.
 3. If present, Medical Control may order Pericardiocentesis as per Pericardiocentesis Care Guideline.
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