

Prehospital Pediatric Care Course

Traumatic Emergencies

Lesson 6

In this lesson, the focus will first be on the following:

- Common mechanisms of injury in children
- Patterns of injury that result from these mechanisms
- Assessment techniques that help EMTs determine the severity of traumatic injury.
- Appropriate interventions for traumatic injuries in children.
- Drowning and near-drowning
- Burns
- Child abuse

Mechanisms and Patterns of Injury in Children

In children, most traumatic injuries involve blunt trauma to the head.

- Head injuries are likely to result in problems affecting the airway and breathing due to loss of or decreased consciousness.

Blunt vs. Penetrating Trauma

- Blunt injury accounts for about 85% of all trauma.
- Penetrating injury occurs in only about 10% of all trauma.
- In blunt trauma, there may be few external signs and an initial non-urgent first impression while serious injuries have occurred.

High-risk Mechanisms of Injury

- Motor vehicle crashes
 - unrestrained passenger
 - pedestrian
- Moderate (5-15 ft) and high falls (15 ft+)
- Diving injuries
- Bicycle crashes while not wearing a helmet.

Lower-risk mechanisms of injury

- Motor vehicle crashes
 - properly restrained passenger
- Low falls (age dependent 2-4 feet)
- Bicycle crashes while wearing a helmet.

Immediate Concerns - Urgent Trauma Patient

- Respiratory failure which occurs due to airway obstruction by tongue or secretions
- Hypoperfusion Children can suffer severe internal injuries to their organs even when there is little external evidence.

Treatment Priorities - Urgent Trauma Patient

The most critical interventions in the majority of pediatric trauma patients are:

- airway management
- cervical spine precautions
- supplemental high-concentration oxygen
- assisted ventilation

Cervical Spine Precautions

EMTs should perform cervical spine precautions for a pediatric trauma patient if:

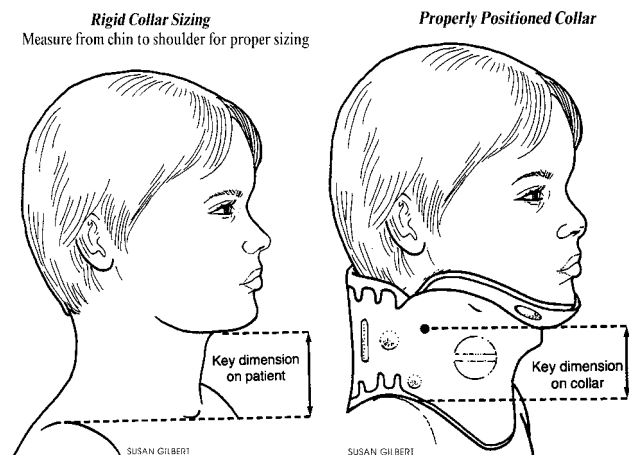
- The child has a high-risk mechanism for head or neck injury
- The child's mental status is anything other than alert, or
- There is evidence of head or neck injury on examination.

Rapid First Impression

- A cervical collar must be applied before moving patient.
- Prior to applying collar, hold manual stabilization.
- Check the back of the neck for
 - crepitus (crunchiness)
 - tenderness
 - muscle spasm

Quickly assess:

- Mental status
- Muscle tone and body position
- Visible breathing movement
- Breathing effort
- Skin color
- Obvious severe injuries



Urgent First Impression-Trauma

For a child with obvious, severe injury

- Immediately provide needed interventions such as bleeding control, splinting, etc.
- Perform cervical spine precautions.
- Begin transport and initial assessment.
- This child's condition is urgent.

EMTs who arrive to find a child who does not seem alert:

- The child's condition is urgent even when there are no obvious injuries.
- Immediately take spinal precautions.
- Provide high concentration oxygen
- Begin transport and initial assessment
- This child's condition is urgent.

For a child with signs of hypoperfusion but no obvious external bleeding:

- Presume that child to have additional injuries causing internal bleeding.
- Continue to assess and reassess.
- Maintain airway and support breathing.
- Transport as soon as possible.

A child who shows signs of hypoperfusion, but whose only obvious injury is head trauma can be presumed to have other injuries.

Head trauma alone cannot cause hypoperfusion in children, except for very young infants. Even then, it is a rare event.

Non-urgent First Impression-Trauma

- Alert
- Possibly sitting up
- Good muscle tone
- Equal movement of the arms and legs
- Normal breathing
- Good skin color.

EMTs must find out whether there was a high-risk mechanism of injury.

Non-urgent Impression-High Risk Mechanism of Injury

A well-appearing patient who has experienced a high-risk mechanism of injury should be treated as potentially unstable due to the risk of serious internal injuries.

- Begin initial assessment quickly.
- Repeat assessment steps frequently.
- Be ready if child's condition worsens.

Non-urgent Impression - Low Risk Mechanism of Injury

- Complete the assessment.
- Obtain a focused history.
- Conduct a detailed physical exam on the scene.

If the child's condition worsens at any time, the EMTs should consider the child urgent, providing ABC interventions and immediate transport.

Extrication Issues

- **Past teaching:** Leave child in safety seat, pad and tape as needed, transport.
- Drawbacks
 - Ineffective immobilization
 - Extended scene time
 - Compromises EMTs' ability to assess and manage airway and breathing.
- **Current teaching:** Remove the child from the safety seat because:
 - easily able to achieve neutral alignment
 - full, unimpeded ability to assess and manage airway and breathing
 - more efficient on-scene time
 - less stressful to child
- For a younger child who is restrained in a child safety seat, most protocols specify that EMTs remove the child from the safety seat, rather than removing the safety seat itself from the car.
- For infants and small toddlers, use a 1" pad from shoulders to buttocks to elevate the back and obtain neutral position.
- EMTs need to remove the patient from the car before they can truly assess and manage the airway and breathing.

Initial Assessment-Airway

AIRWAY

- Maintain cervical spine stabilization.
- Assess the airway.

Responsive child

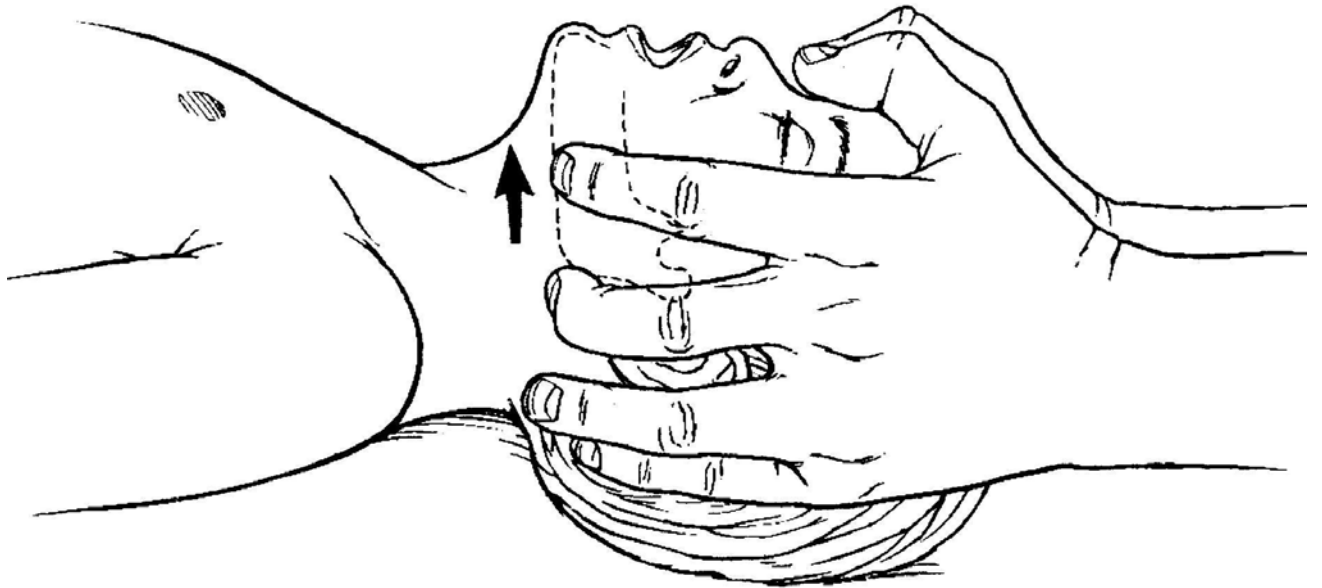
- Talking or crying is good evidence that the airway is open.

Unresponsive child

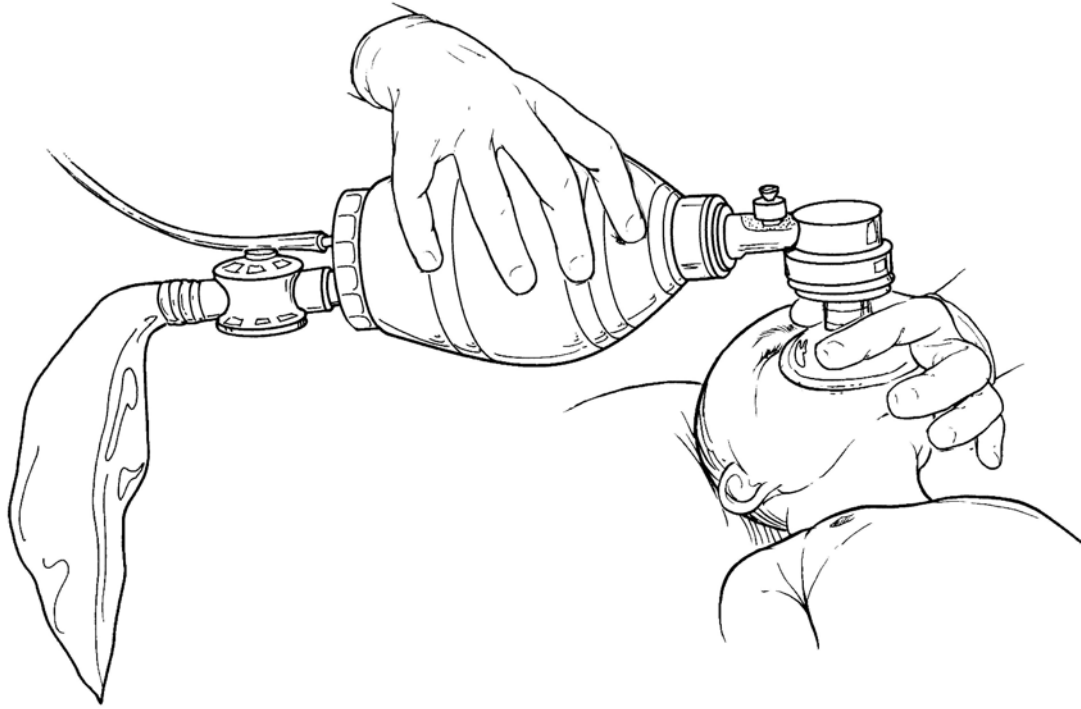
- Maintain cervical spine stabilization.
- Look, listen, feel for air movement.

– If there is no air movement

- Open the airway using a modified jaw thrust while stabilizing C spine.
- Check for foreign bodies and other matter in the mouth and nose, including teeth, secretions, vomit, blood, and fluid.
 - Remove foreign bodies that can be clearly seen and provide gentle suctioning if necessary. Give high-concentration oxygen before and after suctioning.
 - As soon as airway is cleared, recheck for air movement.
- Look, listen, and feel for air movement and gently reposition the airway if necessary while maintaining spinal stabilization.



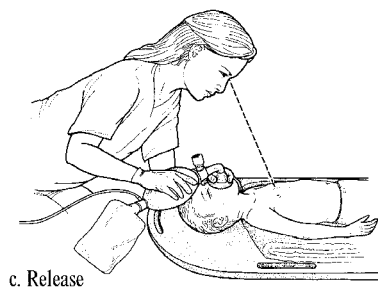
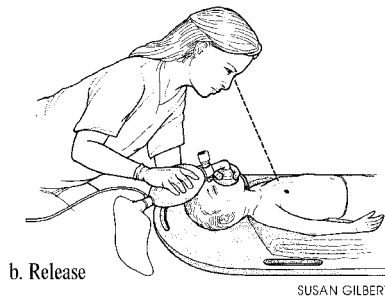
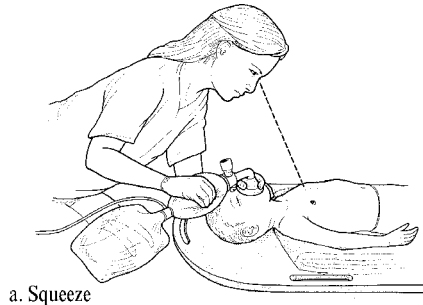
- If there is no air movement, begin assisted ventilation and initiate transport.



- If there is air movement, assess breathing.

Interventions During Breathing Assessment

- After airway opening, provide assisted ventilation using a bag-valve-mask device with supplemental high-concentration oxygen if there is no air movement
- Use the two-handed E-C Clamp to maintain spinal stabilization.
- To keep the airway open without moving the neck, lift the jaw into the mask rather than pushing the mask down on the face.
- Use the “squeeze . . . release . . . release” technique to approximate proper ventilatory rates.



Squeeze Release Release

Initial Assessment-Breathing

- Maintain cervical spine stabilization.
- Assess:
 - Respiratory effort
 - Breath sounds
 - Breathing rate, pattern, and depth
 - Chest wall for life threatening injuries
 - Skin color at the lips and tongue

Interventions During Breathing Assessment

Administer high-concentration oxygen to using a non-rebreather mask if:

- The child shows signs of respiratory distress.
- Breathing is normal but the mechanism of injury was significant.

Assist ventilations with a bag-valve-mask and high-concentration oxygen if the child shows signs of respiratory failure.

For open pneumothorax

Any puncture wound to the chest that makes a gurgling sound when the child breathes should be covered with sterile dressings that prevent air from being sucked into the chest through the wound.

Tape the dressings on three sides to prevent air from being trapped under pressure beneath.

Tension Pneumothorax

If the child shows signs of respiratory failure and has no breath sounds on one side of the chest, there may be a **tension pneumothorax** (air trapped under pressure in the chest, compressing one lung).

To release pressure, a needle must be placed between the ribs and the air pocket. This procedure requires ALS assistance.

Initial Assessment-Circulation

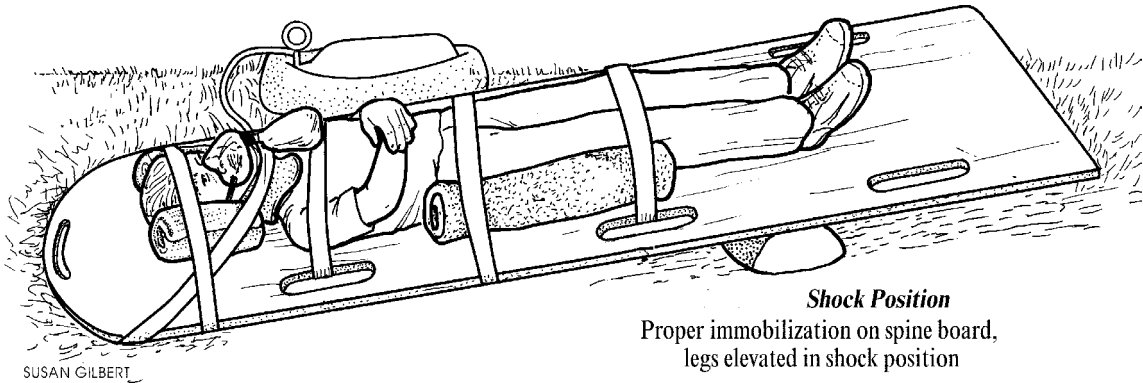
- Look for active bleeding and apply sterile compresses using direct pressure over bleeding sites.
- Check for the presence of central and peripheral pulses and compare their strength.
- Check skin color and temperature as well as capillary refill time.

Circulation Assessment - Trauma Patient

- Repeat initial assessment frequently.
- Be aware of changes in mental state, skin color, breathing effort and rate.
- Compare trunk to extremities
 - skin color
 - temperature

Interventions During Circulation Assessment

- If there are signs of hypoperfusion:
 - fast heart rate
 - poor skin perfusion
- Maintain Cervical Spine immobilization.
- Continue oxygen administration.
- Initiate transport.
- Elevate the foot end of the spine board.
- Preserve body heat.



Initial Assessment - Mental Status AVPU

- **A** Alert status already known.

Differentiate between VPU

- **V** Child responds to a voice
 - Child does not have to speak.
 - Can respond through movement, eye contact, etc.
- **P**ain
 - Squeeze fingernail if child does not respond to voice.
- **U**nresponsive if child does not respond to either voice or pain.

Interventions in Mental Status Assessment

- **A** or **V** Status - Provide high concentration oxygen by non-rebreather mask
- **P** or **U** Status - Provide assisted ventilations with BVM and oxygen reservoir.

Pediatric CUPS Assessment			
Category	Assessment	Actions	Example
Critical	Absent airway, breathing, or circulation	Perform rapid initial interventions and transport simultaneously	Severe traumatic injury with respiratory arrest or cardiac arrest
Unstable	Compromised airway, breathing, or circulation with altered mental status	Perform rapid initial interventions and transport simultaneously	Significant injury with respiratory distress, active bleeding, shock; near-drowning; unresponsiveness
Potentially unstable	Normal airway, breathing, circulation, and mental status <i>BUT</i> significant mechanism of injury or illness	Perform initial assessment with interventions; transport promptly; do focused history and physical exam during transport if time allows	Minor fractures; pedestrian struck by car but with good appearance and normal initial assessment; infant younger than three months with fever
Stable	Normal airway, breathing, circulation, and mental status; no significant mechanism of injury or illness	Perform initial assessment with interventions; do focused history and detailed physical exam; routine transport	Small lacerations, abrasions, or ecchymoses; infant older than three months with fever

Based on CUPS Assessment Table © 1997 N. D. Sanddal, et al. *Critical Trauma Care by the Basic EMT, 4th ed.*

Reassess . . . Reassess . . . Reassess . . . Reassess . . .

- Children with life-threatening injuries may initially present a fairly healthy appearance.
- Therefore, the ABCs and CUPS status should both be continually reassessed throughout transport.
- Treatment decisions may need to be adjusted accordingly.
- ALS backup and delivery to a pediatric trauma center should be considered for any patient whose condition worsens.

Focused History-Urgent

Try to determine what happened without delaying immediate interventions and transport:

Most important:

- Mechanism of Injury
- Time frame
- Changes in mental status

Any head injury severe enough to cause loss of consciousness must be evaluated in the hospital, as serious brain injuries may not become apparent for six to twelve hours.

Focused History-Non Urgent

Obtain as much detail as possible about mechanism of injury.

Consider patient's condition in contrast to the mechanism of injury.

- May indicate potentially unstable patient.

Detailed Physical Exam

Performed on the scene if the patient is stable and non-urgent.

For a potentially unstable or unstable patient:

- Initiate transport
- Support ABCs
- Detailed physical exam is done enroute to hospital, if time allows.

Examine all parts of the body for:

- Deformities
- Ecchymoses (bruising)
- Lacerations and abrasions
- Punctures and penetrating wounds
- Tenderness
- Swelling

Detailed Physical Exam-Head

Check for signs of severe head injury:

- Deep lacerations to the scalp or face
- Blood or watery fluid draining from the nose or ears
- Bruising of the bony area behind the ear
- Bruising around the eyes
- Skull fractures or leaking brain matter

A patient with any of these signs should be considered urgent and transport to a trauma center should already be underway.

Reassess mental status frequently. Changes in mental status may indicate the need for more airway or breathing intervention.

If not already done, perform spinal immobilization and initiate transport.

- Monitor airway and breathing
- Provide high-concentration oxygen.
- Be prepared to assist ventilations with a BVM.

Detailed Physical Exam-Neck

- Check front of neck
- Position of trachea
 - Midline is normal
 - Shifted position indicates life threat
 - Reassess breathing and circulation

SCIWORA

Spinal Cord Injury Without Radiographic Abnormality

Owing to the less rigid anatomy of the pediatric spinal column, the neck bones move easily across each other.

With sudden, forceful neck flexion and extension, there is a potential for spinal cord injury.

The vertebrae can slide across each other and pinch or bruise the spinal nerves without any bones breaking.

Signs of this condition, including numbness or tingling and an inability to move the extremities, may take time to develop.

Detailed Physical Exam-Chest

- Fractures are uncommon in small children:
 - Soft, pliable bones
 - Allows forces to freely pass through chest wall to internal organs
- **Severe internal injuries occur with little or no external sign.**
- Stabilize impaled objects in place with bulky dressings.
- Gently feel for tender areas
- Listen for equal breath sounds
- Reassess respiratory rate and effort every few minutes.

Detailed Physical Exam-Abdomen

Check for:

- Distention
- Ecchymoses (bruises)
- Abrasions
- Penetrating injuries
- Vomiting
 - Note the presence of blood or bile
- Gently feel for tender areas
- Note guarding
 - Where child tenses the abdominal muscles over a painful area may be a sign of serious internal injuries.

A child with guarding is treated as potentially unstable, even when he appears stable.

The liver and spleen are poorly protected by the abdominal wall.

Blunt force to a child's abdominal area makes damage to internal organs likely

- Internal bleeding with little or no outward sign.

Hypoperfusion findings may include guarding in the abdominal area, or altered mental status with an enlarged appearance to the abdominal area.

There may be no abdominal signs.

- Cover stab or puncture wounds with sterile dressings.
- Moisten the dressing with sterile saline if internal organs are showing.
- Stabilize an impaled object with a soft, bulky dressing and do not attempt to remove it.

Stomach Decompression

- When a child's stomach is swollen with air, it can press on the lungs and diaphragm, preventing good ventilation.
- The excess pressure can also cause the heart rate to slow down.

EMTs will need to release this air if **all** of the following findings are present:

- The upper abdomen is swollen and firm.
- Assisted ventilation is difficult, requiring high pressure
- There is poor chest rise
- The pulse rate is slower than normal for the child's age.

There are two ways to address this problem:

- Pass a tube through the nose or mouth into the stomach, or
- Decompress the stomach by pushing on the abdomen.
- Pushing on the abdomen carries a serious risk of
 - vomiting and aspiration
 - loss of airway
 - lung damage
- Therefore, this procedure should only be attempted when passing a tube is not possible.
- Passing a tube is the preferred technique if regional protocols permit. This procedure should only be attempted by personnel who have been trained to perform it.
- If EMTs use stomach decompression, turn the child onto the *left* side and squeeze the abdomen. Have a large-bore suction device ready as vomiting is most likely to ensue.

Detailed Physical Exam-Back

Assess the back for

- tenderness
- ecchymoses
- bony crepitus.
- Do this before immobilizing on a spine board.

Detailed Physical Exam-Pelvis

- Check the pelvis for fractures:
 - Place a hand on each hip bone
 - Squeeze them gently toward each other.
 - Next, push downward, first on one hip, then the other.
 - Finally, place one hand on the pubic bone and press gently.

If the EMTs detect:

- movement of the bony structures
- grating sensations
- pain

Suspect a break in the ring of bone that forms the pelvis.

- Immobilize the pelvis and legs to a spine board.

Detailed Physical Exam-Extremities

- Look and feel for deformed, swollen, bruised, or painful areas.
- Check capillary refill in the extremities and feel for peripheral pulses.
- If an injured arm or leg has:
 - Poor capillary refill
 - No pulse or sensations
- This patient's condition is unstable.

Femur fractures and Hypoperfusion

In children, a fractured femur will not cause enough bleeding to result in hypoperfusion.

If EMTs find that a child with a fractured femur shows signs of hypoperfusion, they should look for other injuries that may be causing additional bleeding.

Extremity Trauma Treatment

- Immobilize deformed or swollen areas using appropriately sized equipment.
- If the area is severely bent, try to straighten it by applying gentle traction, but stop if there is any resistance.
- A traction splint may be used for a possible fracture of the femur.

Trauma and Child Abuse

- Physical injuries suggesting abuse should be assessed and treated in the same manner as any other injury.
- It is always the responsibility of the EMTs to assure that the child receive appropriate care and transportation to a hospital.
- It is **never** the responsibility of the EMT to confront or accuse anyone.
- Confrontation will further upset the child.
- The child will not choose to go with the EMTs, but will want to remain with familiar person.
- Parent or caregiver is likely to become hostile to EMTs
 - May refuse permission for further exam or transportation.
 - Note suspicious findings in the prehospital care report.
 - Bring them to the attention of receiving hospital personnel.

CUPS Assessment for Pediatric Trauma			
Category	Assessment	Actions	Example
Critical	Absent airway, breathing, or circulation	Perform rapid initial interventions and transport simultaneously	Severe traumatic injury with respiratory arrest or cardiac arrest
Unstable	Compromised airway, breathing, or circulation with altered mental status	Perform rapid initial interventions and transport simultaneously	Significant injury with respiratory distress, active bleeding, and shock
Potentially unstable	Normal airway, breathing, circulation, and mental status; high-risk mechanism of injury	Perform initial assessment with interventions; transport promptly; begin focused history and detailed physical exam during transport if time allows	Minor fractures; pedestrian struck by car but with good appearance and normal initial assessment; history of loss of consciousness
Stable	Normal airway, breathing, circulation, and mental status <i>AND</i> low-risk mechanism of injury*	Perform initial assessment with interventions; do focused history and detailed physical examination as needed; transport	Small lacerations, abrasions, or ecchymoses

*Children who appear stable and have a higher-risk mechanism of injury should be considered potentially unstable.

Based on CUPS Assessment Table © 1997 N. D. Sanddal, et al. Critical Trauma Care by the Basic EMT, 4th ed.

Signs of Potential Child Abuse or Neglect	
Environment	<ul style="list-style-type: none"> • unsanitary conditions • unsafe conditions • lack of heat during cold weather • child has inappropriate clothing for weather • parent ignores child or appears incapable of caring for child (e.g., intoxicated)
First impression of child	<ul style="list-style-type: none"> • thin to point of starvation • stares blankly, does not interact with parent or EMT • appears fearful of parents
Initial assessment	<ul style="list-style-type: none"> • child has signs of illness or injuries serious enough to affect ABCs or mental status that have not been cared for
Focused history	<ul style="list-style-type: none"> • inadequate or conflicting explanation for injury • no explanation for injury • explanation for injury does not match physical findings • explanation for injury exceeds child's capabilities • an accusation of abuse made by the child or adult • unexplained delay seeking treatment for injury • history of previous injuries without reasonable explanation • parents unconcerned about major injury • parents overly concerned or defensive about minor injury • unpredictable schedules, frequent parental absences, or inappropriate supervision • lack of routine "well-child" care • vulnerable child: premature baby, child with developmental delay, child with special health care needs, or child of an estranged parent
Detailed physical exam	<ul style="list-style-type: none"> • multiple ecchymoses of different colors • old scars • deformed extremities suggesting poorly healed fractures • "cauliflower" ear • broken teeth • bruising or trauma to the face, including slap marks • head trauma • burns or ecchymoses in unusual locations, such as inner thigh, buttocks, or genitals • scald burns, especially to the hands, feet, or buttocks • pattern burns that appear to be caused by a manufactured object • multiple second- or third-degree burns to the hands, fingers, or genitals • rope burns around the neck, wrists, or ankles • whip marks • pinch marks or human bite marks

Shaken Baby Syndrome

- Most common in infants and children younger than two years.
- There may be no external evidence of trauma, yet severe head injuries can occur.
- Altered mental status may be the only sign that the injury has occurred.

Transport Considerations

- The most effective prehospital treatment for child abuse is transportation of the child to a hospital where legal and social services are available.

Documentation of Child Abuse

- Record observations as clearly and accurately as possible.
- Include factual documentation about the child's environment that is otherwise unavailable to hospital personnel.
- Avoid stating personal feelings, opinions, or interpretations.

Documentation of Child Abuse

- Record any statements that parents or witnesses make in quotation marks.
- Documentation should include the history of the injury or illness.
- Be precise in describing findings from the detailed physical examination.

Reporting At the Hospital

- Personally inform a hospital staff member about your suspicions
 - preferably the physician in charge
- Document the name of the person who received their report.

Pediatric Burns

- Second leading cause of injury-related death in children from 1-14 years old.
- The leading cause of death within the home.
- Most common in children under 3 years of age.
- 80% of childhood burns result from preventable household injuries.
- Many of the rest are due to child abuse.

Impact of Burn Injuries

Skin serves as a barrier and protector for the body. It is the largest organ of both adults and children. For children, it is proportionately larger than for adults.

- Burns breach the integrity of the skin so that the barrier and protection it provides is adversely affected:
 - Burns cause greater stress on the child's body systems than any other type of injury. The following are frequent short-term complications:
 - Dehydration
 - Low body temperature
 - Infection
 - Damage to internal organs

Long-term effects include: severe physical and emotional scarring.

Burn survivors frequently require long hospital stays as well as extensive, painful rehabilitation.

Burn Causes and Types

- There are six major categories of pediatric burn injuries:
- **Scalds** are caused by hot liquids.
 - About 85 percent of severe burns
 - Most involve toddlers
 - Hot tap water is the most common cause
 - Hot drinks and cooking liquids are secondary causes.

The Ten Degree Difference

Tap water set at 130 degrees can quickly scald a child, causing a third-degree burn in just thirty seconds.

Tap water set at 120 degrees takes ten minutes to cause this serious an injury.

- **Flame burns** involve actual contact with flames.
 - Traumatic injuries and airway damage often accompany flame burns.
 - A. M. S., low blood oxygen levels, and hypoperfusion due to fluid loss are also common problems with this type of burn.
- **Contact burns** occur when touching a hot object such as a stove or iron.
- **Radiation burns** in children are almost always caused by overexposure to sun. Sunburns are usually first-degree burns involving skin redness, but occasionally second-degree burns with blisters may result.

Low Voltage Electrical Burns

- **Electrical burns** are caused by contact with electricity in any form.
- Most pediatric electrical burns involve household current, which has a comparatively low voltage:
 - A toddler who chews on an electrical cord
 - A child who puts an object into an electrical outlet

High Voltage Electrical Burns

- High-voltage injuries result from lightning strikes or contact with live power lines:
 - Involve older children
 - Associated with serious problems
 - airway damage, seizures, injury to deep muscles, fractures due to severe muscle spasms, and disturbances in heart function.

Chemical Burns

- **Chemical burns** occur when a child handles or swallows a caustic substance.
- Usually involve household products:
 - drain cleaner
 - automotive battery acid

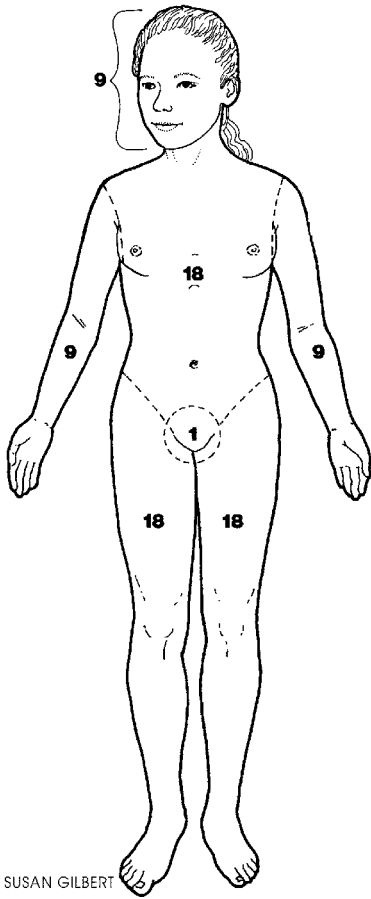
Pediatric Burns

Four key differences between children and adults:

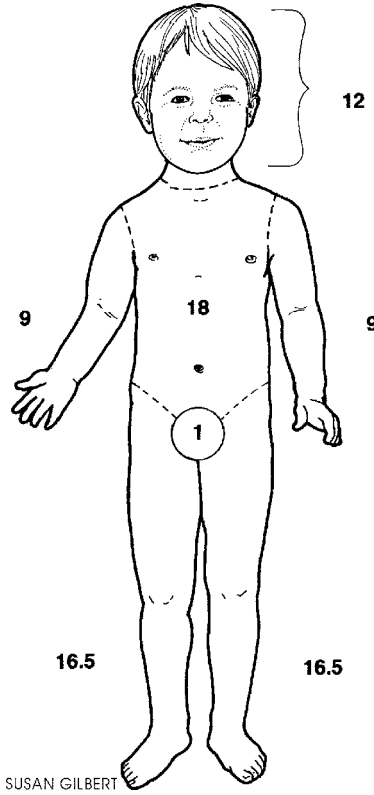
1. Children have thinner skin that is more easily damaged by burns.
2. Young children are more likely to die from burns than adults.
3. Children can be burned accidentally or intentionally.
4. Child's body proportions change over time so that estimating burn area differs:
 - Use different Rule of Nines for infants, young children, and adolescents.

Rule of Nines Infant, Child, Adolescent

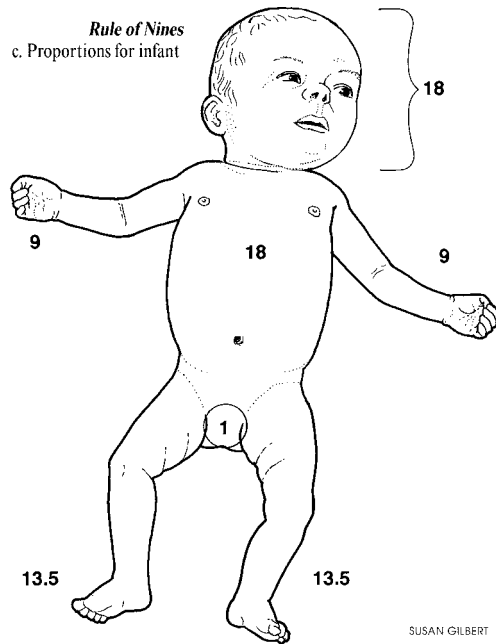
Rule of Nines
a. Proportions for adolescent



Rule of Nines
b. Proportions for child



Rule of Nines
c. Proportions for infant



Assessment and Management

- The first priority is to assure everyone's safety.
- Check the scene for potential dangers from the source of the exposure including:
 - fire
 - hazardous chemicals
 - live electric wire

Assessment and Management

- Stop burning process
- Remove the child from the burn source.
- Stop the burn process before starting assessment.
 - Smother or douse flames from clothing
 - Remove any smoldering clothing that is not stuck to the child's skin.

Assessment and Management

- Assess for risk of inhalation injury:
 -
 - found in a smoke-filled, enclosed space
 - soot around the mouth and nose
 - signs of respiratory distress
 - continual cough
 - stridor
- Provide humidified high concentration oxygen.

Assessment and Management

- If the child shows signs of respiratory failure, immediately begin assisted ventilation with BVM and supplemental oxygen.
- Any child who does not require assisted ventilation should receive humidified high concentration oxygen by non-rebreather face mask.

Burn Assessment Findings

Factors that affect burn management and CUPS status:

- depth and extent of the burn
- burn location
- special circumstances
- burn center criteria

Burn Severity and Risk

Four elements together determine the severity of the burn and the risk to the patient:

- the depth through the skin layers
- the extent of the burn (percentage) on the child's total body surface area
- the location of the burn
- special circumstances that indicate the need for a burn center

- Undress the child, as needed:
 - Cover exposed areas as soon as possible to maintain body temperature
 - Remove all clothing unless it sticks to a burned area.
- Remove jewelry.
- If the child is not alert, remove glasses or contact lenses.

Low Body Temperature Risk

- Pediatric burn patients lose body heat faster than adults causing them to be at greater risk for low body temperature:
 - Large body surface area
 - Thinner skin
- Make sure that they are covered and not in the direct path of a breeze.

Burn Depth

- First Degree Superficial
 - Skin is reddened, painful.
- Second Degree Partial Thickness
 - Skin reddened, blistered, painful
- Third Degree Full Thickness
 - Skin white, waxy, or blackened
 - Not painful due to nerve damage

First or Second Degree?

- A first-degree sunburn covering 40 percent or more of the total body surface area in an infant or toddler should be treated as potentially serious burn.
- Scald burns that initially appear only red may later blister, showing that they are second-degree burns.

Assessing Burn Location

- Second or third degree burns should be considered serious due to their location:
- face
- genitals and rectal area
- hands, feet or any major joint (elbows, knees, wrists, ankles, shoulder, hips)
- burns that completely encircle an arm or leg or the chest
- Transport to a burn center if possible.

Special Circumstances

High-voltage electrical burns are deceiving:

- A small area of visibly burned skin can cover and hide a large, severely burned area of skin, muscle, or bone.
- Immobilize C-Spine and observe closely for hypoperfusion.
- Transport to a Burn Center.

Special Circumstances

- Chemical burns involving swallowed caustic substances causing internal burns with possible respiratory compromise.
- Respiratory failure and arrest can occur suddenly.

Burn Center Criteria

The American Burn Association recommends that a patient who has any of the following problems should be treated in a burn center if possible:

2nd or 3rd degree burns covering more than 10% of the body surface area in patients aged younger than ten years

–2nd or 3rd degree burns covering more than 20% of the body surface area in all patients aged ten years or older

–3rd degree burns covering more than 5% of the body surface area

–2nd or 3rd degree burns that pose a serious danger for loss of function or permanent changes in appearance, including any burn involving the face, genitals, rectal area, hands, feet, or major joints

–any electrical burn

–chemical burns that pose a serious danger for loss of function or permanent changes in appearance (especially swallowed caustics and burns involving the eyes or face)

–burns in combination with inhalation injury

–2nd or 3rd degree burns that entirely encircle an extremity or the chest

–burns with associated trauma in which the burn is the greatest risk to life

In some cases, it may be more practical to transport the patient to the nearest emergency department for stabilization before transferring care to a burn center. EMTs should proceed according to regional protocols.

CUPS Assessment of Pediatric Burns		
Category	Assessment	Actions
Critical	Absent airway, breathing, or circulation; AVPU=P or U	Perform initial interventions and transport simultaneously; call ALS backup; request routing to a burn center if possible
Unstable	Compromised airway, breathing, or circulation; AVPU=V or P	Perform rapid initial assessment and interventions; call for ALS backup if available; transport promptly to a burn center if possible
Potentially unstable	Normal airway, breathing, and circulation; AVPU=A; meets burn center criteria, has risk of inhalation injury, or is possible victim of child abuse	Perform initial assessment and preliminary CUPS assessment; assess and manage burns; transport promptly; begin focused history and physical exam during transport if time allows; consider requesting burn center routing and ALS backup if available
Stable	Normal airway, breathing, and circulation; AVPU=A; does not meet burn center criteria; no risk of inhalation injury; no suspicion of child abuse	Perform initial assessment and preliminary CUPS assessment; assess and manage burns; complete focused history and detailed physical examination; transport promptly

Child Abuse and Burns

- Deliberate acts:
- Be alert for signs that suggest abuse:
- Contact burns caused by cigarettes and other manufactured items
 - a distinctive appearance
 - found in unusual locations (back, inner thighs, genitals, or backs of the hands).
- Scalds arising from child abuse often have a characteristic appearance, such as the “glove” or “stocking” burn from dipping the child’s hand or foot in scalding water.

Near Drowning

The sequence of events in near drowning are:

- The vocal cords close
 - causing an upper airway obstruction
 - prevents air from entering the lungs
 - rapidly leads to low blood oxygen levels

- Low blood oxygen causes
 - altered mental status
 - poor muscle tone
 - a slow pulse rate
 - respiratory arrest
 - cardiopulmonary arrest.

Water Rescue

- Remove child from water, if safety and training allow, but first::
- Cervical spine precautions including
 - Logroll, if prone, onto spineboard
- Immobilize all children who have:
 - a diving injury
 - another mechanism of injury that could damage the neck or spine
 - AMS with no clear mechanism of injury.

- Establish an open airway:
 - Open airway with modified jaw thrust
 - Ventilate via pocket mask or BVM
 - Proceed with removal from water.

Assessment

- Reassess the airway and breathing
- Check for signs of respiratory distress or failure, in responsive patient.
- Continue assisted ventilation of unresponsive patient.
 - Add oxygen source as soon as possible.
- Begin transport as soon as possible.
- Assess circulation:
- EMTs may find it difficult to feel a pulse in children suffering near-drowning.
 - Blood vessels constrict
 - Heart pumps weakly
- Pulses may not be palpable
 - Initiate chest compressions if
 - no central pulse
 - pulse rate less than 60/min

Cold Water Near Drowning

- Slow pulse rates are very common in cold water pediatric near-drowning incidents
- If the child has a very low body temperature, pulses may be so weak and slow that they are nearly impossible to detect, in which case the child will appear dead.
- When the body is very cold
 - brain cells need less oxygen and energy
- Survival is possible, even after long submersion.
- Initiate and continue resuscitation efforts throughout transport.

Prevent Further Heat Loss

As soon as possible after removing from the water:

- Place the child in a warm environment, heated ambulance
- Remove the child's wet clothing
- Dry the child
- Provide heat lamps or warm blankets.

CUPS Assessment of Pediatric Near-Drowning		
Category	Assessment	Actions
Critical	Absent airway, breathing, or circulation; AVPU=P or U	Perform initial interventions and transport simultaneously; call for ALS backup if available
Unstable	Compromised airway, breathing, or circulation; AVPU=V	Perform initial assessment and interventions; transport promptly; call for ALS backup if available
Potentially unstable	Normal airway, breathing, and circulation and AVPU=A, BUT child required assisted ventilation, or was underwater and needed help getting out, or experienced choking and coughing after removal from water	Perform initial assessment and interventions; transport promptly; begin focused history and physical exam during transport if time allows
Stable	Normal airway, breathing, and circulation; AVPU=A	Perform initial assessment and interventions; complete focused history and detailed physical examination; transport

Secondary Drowning

- Child appears well after submersion incident with:
 - Trouble resurfacing
 - Protracted coughing spell after being assisted to surface
- Aspiration of water or stomach contents may have occurred
- Symptoms of acute respiratory distress may take hours to develop.
- EMTs must transport every child who has any problem following a submersion no matter where it occurred:
 - bathtub
 - sink
 - pool
 - lake
 - river
 - ocean

Focused History

Find out about the child:

- how long the child was underwater
- mechanism of injury involved
 - struck object while diving
- alcohol or other drugs before the incident
- whether the patient has any medical history, such as seizures, that may have contributed to the incident.

Find out about the water:

- the approximate water temperature
- whether the water is clean or polluted
- whether the water is salt or fresh
- Notify hospital while en route.