

T10

BURNS

EMS personnel must focus initial care for the burn patient on stopping the burn process and establishing and maintaining the ABCs.

GENERAL

- ensure personal safety and safety of bystanders
- personal protective equipment should be utilized as appropriate
- body substance isolation techniques and equipment should be utilized as appropriate
- remove the patient from the burn or radiation source
 - consider possibility of traumatic injuries in burn patients (e.g. fall from a height, exiting through a window)
- specially trained personnel may be required to access the patient and transport them to a safe environment
- remove any burning material
- consider cervical spine precautions
- maintenance of an open airway and ensuring adequate respirations has priority over all other treatments including control of the cervical spine
- calm and reassure the patient
- primary survey
 - establish ABCs
 - consider an inhalation injury with potential airway compromise if any or all of the following clinical indicators are present
 - history of altered mental status
 - history of confinement in a burning environment (e.g. trapped in a closed fire environment) burns to the head, face, nose, mouth, neck, or torso
 - singed eyebrows and nasal hair
 - carbon deposits in the nose or mouth
 - acute inflammatory changes in the oropharynx
 - carbonaceous sputum
 - stridor
 - explosion with burns to head and torso
 - presence of any of these findings suggests acute inhalation injury
 - these injuries require immediate and definitive care and close monitoring for changes in the patient's respiratory status
 - load and go should be considered if any of these are present

- administer 100% oxygen and support respirations as required
- repeat and record vital signs at regular intervals (5-15 mins.) or when there is a change in the patient's status
- secondary survey
 - estimate percentage of body surface area injured by using the Rule of Nines
 - estimate depth of burn
 - assess for other injuries
- initial treatment of injuries should be based on the patient's signs and symptoms
- pay particular attention to the presence of the following injuries, because they are associated with particular complications
 - direct thermal injury
 - upper airway edema or obstruction
 - inhalation of products of incomplete combustion (carbon particles) and toxic fumes
 - tracheal and bronchial inflammation, edema, and pneumonia
 - carbon monoxide (CO) poisoning
 - respiratory distress, chest pain, altered mental status, seizures, coma
- remove jewelry from any extremity that has been burned if possible, without further injuring the patient
 - jewelry may need to be cut off in order to remove it
 - document the disposition of jewelry removed
- treat burns
 - do not apply any ointment to a burn
 - do not break blisters
- treat for shock, if indicated
- treat other injuries if the patient's condition permits
- cold compresses should not be used for pain control
 - do not continue to apply cool saline or water to the burns once the burning process has been stopped
 - ongoing application of cold solutions may cause hypothermia
- maintain high concentration oxygen delivery to the patient
 - assist ventilations if required
- do not allow the patient to exert him/herself - e.g. walking, standing unassisted to transfer to the stretcher, etc.
- load and go should be initiated if a significant burn is recognized, or there are potentially life-threatening complications due to the burn
 - on scene times should be kept to a minimum
 - treat other life-threatening conditions en route
- transport the patient to the nearest appropriate health care facility
 - notify the receiving health care facility of the patient's status as soon as possible
 - monitor and treat the patient en route
 - additional surveys and treatments should be conducted en route
- document all actions including the decision to initiate load and go
- report all findings to the receiving facility staff, and document on the patient care report

SPECIAL CONSIDERATIONS**Thermal Burns****Moderate to Severe**

- maintain high concentration oxygen delivery to the patient
 - assist ventilations if required
- assess the patient for airway and respiratory complications
 - if there is evidence of an impending airway obstruction or severe respiratory compromise, and advanced life support (ALS) is available, EMS personnel should request early response of these personnel to the scene or consider an ALS intercept while en route
 - initiation of transport should not be delayed for ALS arrival
- ensure burning material is removed
 - Irrigation of a burn can cause hypothermia and introduce infection in compromised skin, and is not an appropriate method of pain control
- cover burned area with sterile soaked saline dressing, then cover with dry dressings
- initiate early load and go
- monitor the patient's status closely
 - initiate load and go at any point during assessments if dictated by the patient's condition

Chemical Burns

- attempt to identify the contaminant
- inform the receiving health care facility of the nature of the patient's exposure to the hazardous materials so decontamination procedures (if not done at the scene) and treatment preparations can be initiated
 - do this as early as possible to permit adequate preparation time at the receiving facility
- an additional ambulance(s) and additional EMS staff may be required to transport the patient if the initial EMS personnel or their ambulance become contaminated
- remove contaminant - see Poisoning Guideline
- flush the contaminated areas on the patient with saline or water
 - extensive flushing of the patient's skin or eyes may be required (often 20 minutes)
- load and go should be immediately initiated only once the contaminant is removed
 - attempting to remove the contaminant while en route can result in significant chemical exposure to the crew and contamination of the ambulance
 - transport should be initiated immediately only if criteria for load and go are met and there is an immediate threat to life
- avoid contamination of other areas of the patient or EMS personnel

on the skin

- remove contaminated clothing and flush the skin with saline or water for twenty minutes
- if contaminant is dry powder, brush off thoroughly before flushing the skin

in the eye

- flood the eye with lukewarm saline or water for twenty minutes
- position the patient so runoff from the eye does not contaminate the other eye or other areas of the patient

- have the patient blink frequently during irrigation
- cover burned eye with moist dressings, then cover moist dressings with dry dressings

Electrical Burns (including lightning)

- eliminate the electrical contact or shut off the power
- monitor the patient for possible cardiac arrhythmias
- if the patient is in cardiac arrest
 - initiate CPR and
 - defibrillate as per Defibrillation Protocol
- consider load and go
- treat as thermal burns
- consider cervical spine injuries
 - initiate cervical spine control in primary survey
 - immobilize if required
- consider other possible injuries (fractures, dislocations)
 - immobilize if required
- treat for shock, if indicated

Corneal Burns

- often found as a complication to flash burns to the face
 - assess for airway burns
- rinse the eyes with saline or water
- cover both eyes with moist, sterile dressings

Radiation Burns

- inform the receiving health care facility of the nature of the patient's exposure to the hazardous materials so decontamination procedures (if not done at the scene) and treatment preparations can be initiated
 - do this as early as possible to permit adequate preparation time at the receiving facility
- an additional ambulance(s) and additional EMS staff may be required to transport the patient if the initial EMS personnel or their ambulance become contaminated
- see Poisoning Guideline for Hazardous Material Exposure for safety procedures and emergency contact telephone numbers
 - specialized assistance may be required
 - along with personal protective equipment and body substance isolation techniques masks should be worn by all attending personnel
 - consider the patient and everything that comes in contact with the patient including EMS personnel, equipment and ambulances as contaminated
- remove the patient's clothing and dispose of in appropriate containers
- treat wounds, burns, and other injuries as indicated

NOTE

- a burn is an injury that results from contact with heat, chemical agents, electricity or radiation
- complications often found in patients with burns include
 - airway or respiratory difficulties
 - shock (due to loss of intravascular volume)
 - pain
 - swelling
 - infection
 - fractures
 - entrance/exit wounds
- when responding to a scene involving fire, chemical spills, electrocution, or radiation hazard, the first priority must be for the EMS personnel's safety - see Poisoning Guideline
- thermal injury patients frequently develop hypothermia or shock
- maintain a high level of suspicion for complications in patients with smoke inhalation
- maintain a high level of suspicion for airway problems in patients with burns involving the face, head, neck, chest, or patients who were confined in a fire environment
- pulse oximeter readings are often inaccurate and misleading in patients who have been in an enclosed fire where carbon monoxide was present
- fractures and muscle injuries are common complications in incidents of electrical shock
- elevate burned limb(s) if possible, and position patient according to injury
- transportation of burn patients should not be delayed
 - transport should be to the nearest appropriate health care facility
- EMS personnel trained and certified in the use of morphine may do so to manage pain associated with the burns, as outlined in the Burn Management Protocol
- EMS personnel trained and certified in the use of nitrous oxide – oxygen mixture may do so to manage pain associated with the burns, as outlined in the Nitrous Oxide – Oxygen (50:50 mixture) Protocol

Table 1 – Depth of Burns and their Characteristics

DEPTH OF BURN	CHARACTERISTICS
First-Degree (Superficial) Burns	Characterized by reddened skin, pain, and the absence of blisters.
Second-Degree (Partial-Thickness) Burns	Characterized by a red or mottled appearance with associated swelling and blister formation. The surface may have a weeping, wet appearance and is painfully hypersensitive, even to air currents.
Third-Degree (Full-Thickness) Burns	Usually appear dark and leathery. The skin also may appear translucent, mottled, or waxy white. The surface may be red and does not blanch with pressure. The surface is painless and generally dry.

- the depth of burn is important in evaluating the severity of the burn, planning for wound care, and predicting complications

Table 2 – Burn Transport Classifications

Severe Burns – initiate load and go

→ includes all burns complicated with airway or respiratory problems, major or multiple fractures, or major wounds

→ these patients should be transported to a burn center, if one is available locally

- 1st degree burns over more than 70% of the body
- 2nd degree burns over more than 30% of the body
- 3rd degree burns over more than 10% of the body
- 3rd degree burns involving critical areas – face, hands, feet, genitalia or perineum, or areas overlying major joints
- any burn on an infant
- significant electrical burns
- significant chemical burns
- burn injury in patients with a serious preexisting medical condition (e.g. diabetes, cardiac, respiratory, drug therapy, etc.)
- burn injury complicated by trauma or cardiopulmonary arrest
- burn injury with inhalation injury or airway compromise

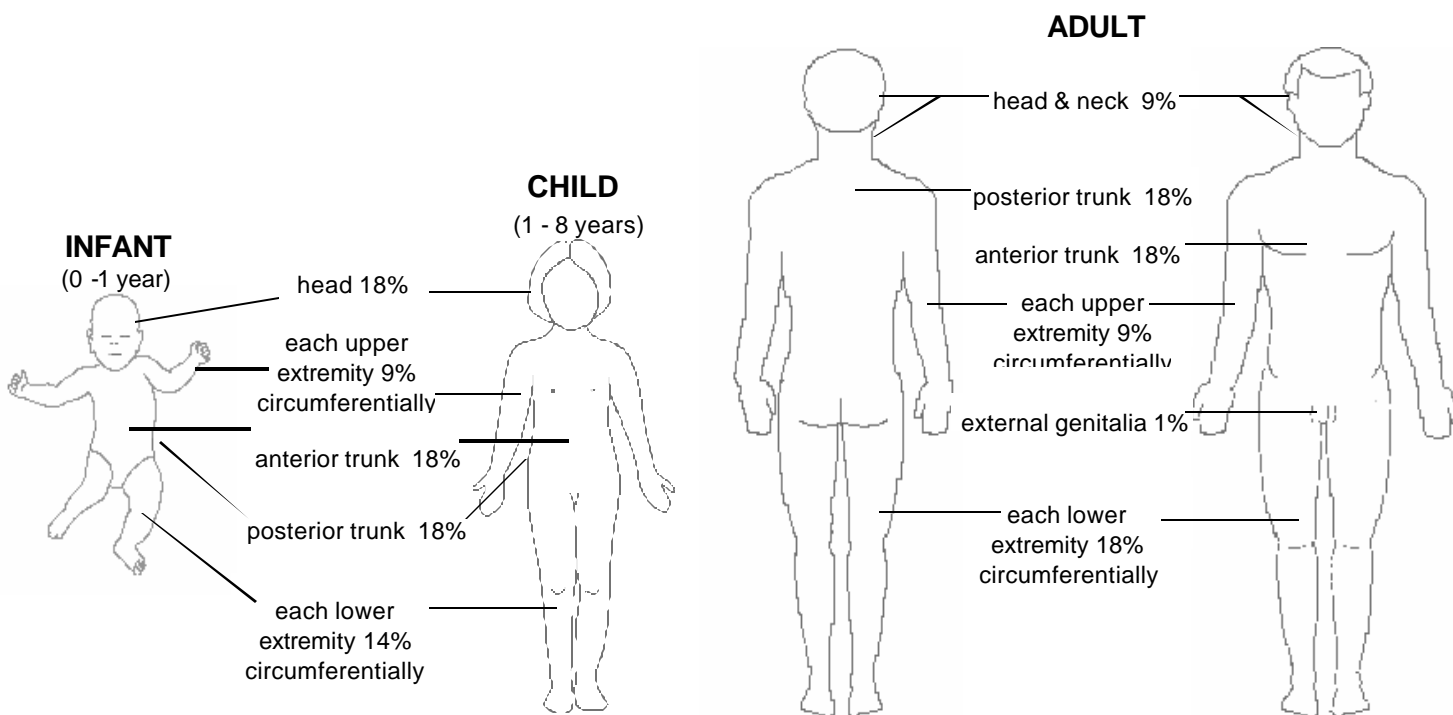
Moderate Burns – consider initiating load and go

- 1st degree burns that cover 50% - 70% of the body
- 2nd degree burns involving 15% - 30% of the body
- 3rd degree burns involving less than 10% of the body, excluding the face, hands, or feet

Minor Burns – consider initiating load and go based on underlying or complicating factors

- 1st degree burns that involve less than 50% of the body
- 2nd degree burns that involve less than 15% of the body
- 3rd degree burns that involve less than 2% of the body, excluding the face, hands, or feet

Figure 1 – Rule of Nines for Estimation of Body Surface Area Affected by Burn



- as a general guide, the area of the patient's palm is approximately one per cent (1%) of the patient's body surface area
 - this can be used as a tool to estimate the total area burned
- body surface area distribution in a young child or infant differs considerably from the body surface area distribution for an adult
 - the infant or young child's head represents a larger portion of the surface area, and the lower extremities a lesser portion, when compared to an adult
 - the percentage of total body surface of the small child and infant's head is twice that of the normal adult

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