

# 11

## BURNS

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Figure 1. Full thickness burns with eschar (ICRC)



Figure 2. A typical ward setting, without ventilator support (Baumgartne - Henley)

## SCENARIO

You are in a type 2 facility in an area of internal conflict where the normal health service has collapsed. Six children arrive with burn injuries from a house fire sustained six hours ago. No first aid has been administered. A 10 year old has 75% TBSA deep burns with evidence of inhalation injury and is in extremis, a 10 year old has 50% TBSA mixed depth burns and is hypovolemic, an 8 year old has 30% TBSA superficial burns, a 5 year old with 10% TBSA superficial burns and two very young children present with erythematous faces and hands. There is a facility in the country that has critical care beds but it is uncertain if there is burn surgery expertise. Travel to that facility is unreliable and risky.

What are your priorities in allocating your limited resources to these patients?



TYPE 1

- Superficial burns up to 5% can be treated at these outpatient facilities, as these burns can heal without surgery.
- Burns that heal spontaneously in less than 2 weeks are unlikely to scar **nor** require surgery



TYPE 2

- Burns up to 20% TBSA as they can often be managed without ICU capabilities.
- If some degree of ICU care is present at type 2 then straightforward burns up to 40% can be managed at the type 2



TYPE 3

- All burns greater than 40% TBSA
- Burns to the face, hands, perineum, genitals and soles of feet
- If possible to integrate the type 3 with local services then most burn patients requiring lengthy admissions will benefit from transfer to a type 3.

The best results surrounding burn survival have been achieved in high resource centres of excellence able to deliver an accurate early assessment and aggressive initial treatment. This centralization of care, while useful for patients at these centres, and the specialized staff at burn centres, has reduced the burn care experience of the medical community at large.

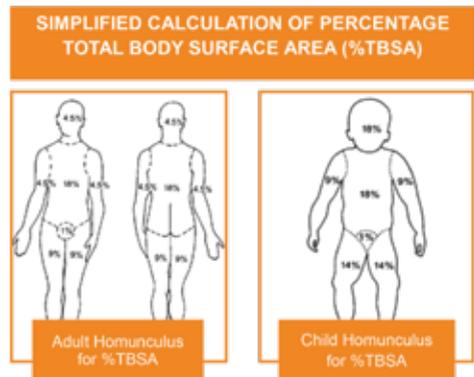
- » In underdeveloped health systems, the expected outcome from burn injuries is poor and expertise is not available.
- » It can be anticipated that the management of burn injury related to disasters and conflict will present significant challenges.
- » Assets to manage large burn injuries will be scarce in conflicts and SODs and must be allocated to the patient who will benefit most from them.
- » Simple burns should be managed in an out patient setting and not referred, and patients with extensive burns and a low likelihood of survival should receive their comfort care outside of specialist centers.

## DIFFICULTIES OF BURN CARE IN CONFLICTS AND DISASTERS

- » Burn injuries are unpleasant and apart from the simplest cases require expertise and experience to manage.
- » Burns can place significant burdens on staff, time and resources.
- » Survivability is, in part, related to the availability of care and resources that can be allocated to an individual patient.
- » Inhalation injury and even moderate size burns can stimulate significant physiological derangement making management difficult without ICU capabilities.
- » The full clinical manifestation of a burn injury may take hours to develop and patients with burn injury so severe that survival is not expected may stay alive for many hours.

## DEPLOYED TEAMS

**It is a general principle of EMTs deployed in response to SODs and conflict that they match their care delivery to the pre-event capabilities of the country to which they are deployed.**



**Figure 3.** Adult and Paediatric diagrams for calculating Total Body Surface Area (TBSA). Discussions and decisions regarding survivability and required level of care for burns are often made based on TBSA, therefore an accurate estimate of the extent of a burn is important. (ICRC)

## SODS

- » Burn injuries are commonly encountered in natural disasters but are not often related to the primary incident.
- » Often burn incidents are a result of alterations to human behaviour secondary to the social shock of the disaster.
- » Much of the protection from burn injury in normal society comes from public health and safety practices, both legislative and practical. All of this can be lost following a SOD.
- » New activities of daily living (ADLs), such as cooking over an open flame, can be made necessary by disasters and can increase the risk of burn injury.

## MASS BURN CASUALTY EVENTS

- » Mass burn casualty events are usually the result of human activity and can themselves be the main feature of man-made disasters.
- » Examples include the regular occurrence of multiple burn injuries due to pipeline fuel incidents.

## CONFLICT

- » The incidence of burn injury in conflicts varies with the type of military activity, with experience suggesting that between 2-10% of casualties arriving alive at medical treatment facilities (MTFs) can be expected to have a burn injury.
- » Dismounted infantry fighters in open areas sustain few burns but the incidence rises with the use of protective vehicles or ships.
- » Non-combatants may be caught up in the fighting and sustain burns due to direct military action.
- » The use of specific incendiary weapons is still encountered, however it is the impact on normal patterns of life that most change the incidence of civilian burn injury.

### KEY POINT

- » Apart from mass casualty events, populations in SODs and conflict will have a sustained higher incidence of burns compared to normal for that society.

## SPECIAL CONTEXTS: WEAPONS OF MASS EFFECT

### NUCLEAR DETONATION

- » A nuclear blast is not totally beyond the realm of possibility and very large numbers of burn injuries could be generated very quickly.
- » The poor outcomes from burn injuries following Hiroshima and Nagasaki were most likely due to the disruption of health services rather than any specific consequences of a combined thermal and radiation insult.

### CHEMICAL WEAPONS

- » Vesicant chemical warfare agents such as Sulfur Mustard are easy to manufacture and have been utilized in recent conflicts.
- » It is possible that both SODs and conflicts may increase the risk of exposure to toxic industrial chemicals and corrosive domestic products.
- » It should be anticipated that chemical burns may be encountered in unstable environments.

### ELECTRICAL BURNS

- » Similarly to burns in general, changes to normal society may increase the risk of electrical burns to both children and adults.

## ELEMENTS AND PRIORITIES OF BURN INJURY AND CARE

### THERE ARE 3 ELEMENTS OF BURN INJURY

1. Cutaneous burn wounds
2. Systemic effects
3. Inhalation Injury

### THERE ARE 4 PRIORITIES OF BURN TREATMENT

1. Protect the upper airways from obstruction due to swelling
2. Ensure adequate tissue perfusion through fluid administration and monitoring of response to the fluid
3. Provide optimal conditions to ensure burn wound healing
4. Provide general supportive measures such as analgesia, feeding and physiotherapy

## PITFALL

Early assessment of burn depth and extent of burns may not be accurate. Often an overestimation of depth and extent is made when inexperienced practitioners make the assessment.

The danger lies in overestimating the extent of the burns on first look without formal cleansing in an operating theatre. This can result in deliberately limiting the care in a patient with survivable burns.

# ASSESSMENT

The treatment of burn injuries will be driven by 3 key assessments:

## WHAT IS THE EXTENT OF THE BURN?

- » This measure drives the initial requirements for fluid resuscitation.
- » The size of the burn is expressed as the percentage of the body's total surface body area (%TBSA) that is burnt.
- » This can be calculated using the Rule of Nines or a Lund and Browder Chart
- » The patient's palm and fingers together represent 1% TBSA
- » Burns over 20% TBSA will result in clinically significant alterations in physiology
- » Burns over 30% TBSA may trigger a Systemic Inflammatory Response.

## WHAT IS THE DEPTH OF BURN ?

- » The depth of the burn dictates the wound care regimen.
- » Burns must be scrubbed clean prior to any assessment being made.
- » Accurate estimation of burn depth in the first 24-48 hours can be difficult, particularly for practitioners inexperienced in burn care.
- » Differing areas of depth can be seen on a single wound.
- » Simple skin erythema with blistering is not a clinically relevant burn.
- » Wet appearing, blistered areas with marked erythema and brisk capillary refill are often superficial partial thickness burns.
- » Dry appearing areas with non blanching redness (fixed staining) usually represent deeper burns, while full thickness burns can be white.
- » Pain is not a good indicator of burn depth.
- » Superficial partial thickness burns should heal without surgery if managed correctly.
- » Burns that heal spontaneously in less than 2 weeks do not normally result in scarring.

## IS AN INHALATION INJURY PRESENT?

- » A history of receiving the burn in an enclosed space with flame or smoke, a hoarse voice, cough, stridor, peri or intra-oral burns, soot in the sputum and an otherwise unexplained or reduced level of consciousness all indicate the possibility of an inhalation injury.
- » Inhalation injuries are generally a fatal injury in an environment without an ICU.
- » An upper airway inhalation injury is a true thermal burn with a risk of subsequent airway obstruction causing obstruction.
- » Lower airway injury is effectively a chemical insult from the noxious products of combustion and can lead to progressive pulmonary failure.
- » Absorption of the products of combustion in the circulation leads to systemic intoxication.

# ASSESSMENT

## FIRST AID FOR BURNS

- » Stop the burning process: Remove the source of the injury, cool the affected area to prevent on-going burning, remove clothes and other articles that may still be hot, remove any constricting items such as belts, boots, watches, or rings.
- » Continue to cool the affected area with normal domestic temperature water (this can be clean tap water, it does not need to be sterile) for about 30 minutes after the injury. This reduces the inflammation and pain and is appropriate for chemical burns as it dilutes the damaging agent.
- » Give analgesia and cover the wound until medical care is reached.

## EMT TYPE 1

- » Burns that appear to be superficial partial thickness at less than 5% TBSA (up to 10% in adults) can be treated in the outpatient setting.
- » Adequate analgesia should be administered and the burn washed with antiseptic solution.
- » Blisters should be burst and blister roofs removed and a clean dressing applied.
- » Prophylactic antibiotics are not routinely used for simple burn care, but it may be prudent to administer a three-dose course of a broad-spectrum antibiotic such as amoxicillin/clavulanic acid, if good wound hygiene cannot be ensured.
- » The burn will be painful for several days so adequate analgesia should be given, e.g. a mixture of paracetamol and codeine.
- » Patients should be advised to return to a medical facility if they become unwell or develops obvious signs of infection (fever, spreading erythema, increasing pain).
- » The burn should be assessed at a medical facility 2 days following the initial visit in order to assess the depth and size and assess for signs of infection. The burn should be cleaned and have a fresh dressing applied as well, and families given wound care instructions at this time.
- » Patients should be advised to seek medical care if the burn has not healed within two weeks. If at the 2 week point, there are confluent areas adding to 1% TBSA then the patient should be referred for surgical evaluation.
- » Healed burns should have a moisturizing agent applied for two weeks after injury or longer if the skin remains dry. Sun protection is important to avoid permanent changes in skin pigmentation for one year following injury.
- » When transferring a burned patient, if there is minimal concern for delays in transport then the wound does not require a formal dressing. Laying clear plastic food wrap over the burn will suffice for 12 -24 hours as long as the wound was thoroughly washed. The limb should not be circumferentially wrapped.

## EMT TYPE 1

### CRITERIA FOR TRANSFER

- » Burns greater than 10% TBSA irrespective of depth, deep partial thickness or full thickness burns greater than 1% TBSA, any evidence of inhalation injury, evidence of infection or concomitant significant injuries need to be transferred to a type 2 facility.
- » Ideally, patients being transferred to a more capable facility should be moved without delay.
- » Patients should have adequate analgesia for transport and must be kept warm.
- » If there is any concern about the adequacy of fluid input and for all burns over 20% TBSA, IV fluids should be administered at 10 mL per hour for every 10% TBSA.

## EMT TYPE 2

### BURN CARE AT THE EMT TYPE 2

The care of simple burns at the type 2 does not differ from the management at type 1 facilities.

### RE-ASSESSMENT

- » A history should be taken and a clinical examination performed with particular attention paid to excluding other injuries and illnesses. A detailed assessment of size and depth for larger burns requires the wound to be scrubbed down under adequate analgesia and preferably a general anaesthetic in an operating theatre.
- » There are some smartphone based applications available to help in burn size mapping with some limited evidence that they are easier to use and more accurate than a Lund & Browder chart.
- » Upper airway assessment can be made by direct laryngoscopy at the time of induction for anaesthesia. There is no way to definitively assess the lower airways without the aid of bronchoscopy. Therefore, much of the diagnosis of inhalation injury relies on clinical examination supplemented by radiology and blood gas analysis if available.

### KEY POINT

- » For burns over 20% TBSA secure IV access, a nasogastric tube and a urinary catheter for monitoring of urine output (UOP) should all be placed.

## ESCHAROTOMY

- » Circumferential deep burns around the torso and limbs must be identified.
- » As swelling increases the unyielding burn eschar can lead to a rise in tissue pressure with associated reduction in perfusion, and respiratory excursion can be compromised in the torso.
- » In this instance escharotomies must be performed to relieve the pressure (Figure 4)
- » This should be performed in an operating theatre as a formal surgical procedure under general anaesthetic.
- » If performed correctly there is often significant bleeding and meticulous attention must be paid to haemostasis.
- » It is important that the escharotomies extend along the whole length of the burnt area and into normal tissue.
- » The horizontal torso incision should be, at least in part, below the costal margin to allow abdominal expansion.
- » Burns of any depth over 10% will most likely need significant analgesia for the first couple of days and, therefore, admission.

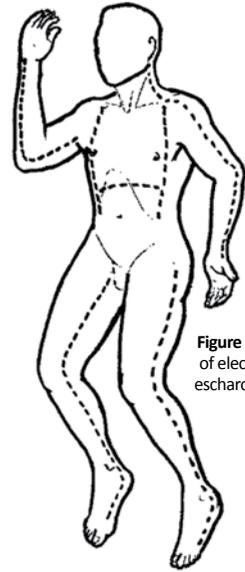


Figure 4. Lines of election for escharotomies (Kay)

## DIFFICULT DECISION MAKING IN CONFLICTS AND DISASTERS

**Burn management is a resource intensive process and decisions must be made quickly where or if continued care of a patient should occur.**

- » Attempts should be made to establish what expert burn care facilities are available (or likely to become available soon) and consider referral.
- » Outside of centers of excellence definite severe inhalation injury and deep burns greater than 60% TBSA are unlikely to survive.
- » Such patients should be discussed to avoid transferring cases when on-going care is deemed futile.

## FLUID MANAGEMENT AND RESUSCITATION

- » Burns up to 20% can be managed with oral rehydration.
- » It is important to still make an assessment of hydration status and provide IV fluids if it is apparent that oral rehydration alone is not providing adequate input.
- » Burns over 20% TBSA should be given intravenous crystalloid in the first 24 hours as prophylactic fluids to reduce the chances of developing burn shock.
- » Hartmann's / Lactated Ringers is preferable to Normal Saline. The formula of  $2\text{ mL} \times \%TBSA$  burned  $\times$  body weight in kilograms should be used as a starting point. This calculation gives a volume of crystalloid in mL that is likely to be required in the first 24 hours from the time of injury.
- » The first half of the total fluid calculated should be administered over the first 8 hours from the time of injury and the second half of the fluid given over the subsequent 16 hours.
- » Urine output is the best guide to adequacy of input with a target of 0.5 ml/Kg/hr (1ml/Kg/hr in children). The urine output should be measured hourly.
- » Two consecutive hours of either too much or too little urine compared to the target output should initiate a change of intravenous input either down or up by 20%.

FLUID REQUIREMENTS IN FIRST 48 HOURS		
HOURS SINCE BURN	FLUID REQUIREMENTS	
0-24 HOURS	2 ml/kg $\times$ % TBSA of Ringers Lactate (1/2 in first 8 hours, 1/2 in following 16 hours)	Target Urine Output = 0.5 ml/kg/hr
24-48 HOURS	To be guided by urine output	
<b>SPECIAL CONSIDERATIONS:</b> <ul style="list-style-type: none"> <li>• Burns &gt; 50% TBSA: Use 50% TBSA in calculations above</li> <li>• Inhalation injury/electric burns: Have increased fluid requirements, use <math>3\text{ml/kg} \times \%TBSA</math></li> </ul>		

Figure 6. Resuscitation for ICRC burn protocol (ICRC)

## PAEDIATRIC CONSIDERATIONS

- » Historically, children with >20% TBSA have been resuscitated with  $3\text{ mL/kg} \times \%TBSA$ , this frequently leads to fluid overload. The  $2\text{ mL/kg} \times \%TBSA$  guideline should be used in children as well as adults.

## PITFALL

Thirst alone is a poor indicator of hydration status

Administration of excessive fluids can be just as detrimental to the patient as under-resuscitation with fluid.

## KEY POINT

- » If there has been a significant delay in presentation, avoid catching up on fluid as a bolus, spread the volume out over several hours.

## SUPPORTIVE MEASURES FOR BURNS

- » Patients with large burns are particularly susceptible to hypothermia and all efforts should be made to prevent this.
- » Burns are painful and psychologically distressing. It is essential to maintain adequate levels of analgesia including opiates if necessary.
- » A protocol of continuous background levels of analgesics should be established with top ups administered as needed for stimulating activities such as physiotherapy or attention to dressings.
- » NSAIDs should be avoided for at least 48 hours post injury because of the risk of renal injury.
- » It is beneficial to maintain gut function and adequate nutrition from as early on as possible. This is best achieved by establishing early feeding and in larger burns this will only be achieved via a nasogastric tube.
- » Prophylaxis against peptic ulceration should be administered in addition to feeding.
- » Initially the patient with a large burn will have a coagulopathy. The risk from venous thromboembolism soon rises and prophylaxis is indicated from day 2 unless there are other contraindications.
- » Antibiotic prophylaxis beyond three doses is not advocated. Further administration of antibiotics should be limited to treatment doses for clinically suspected infection. It should be noted that a tachycardia and pyrexia can be part of the normal response to systemic inflammation and do not necessarily indicate infection.
- » Keeping a patient sitting up with limbs elevated will help reduce swelling.

## NUTRITION

- » Nutrition in burn patients is extremely important, however enteric or tube feeds may not be available.
- » It is possible to improvise liquid tube feeds by crushing biscuits into milk or beaten eggs if proprietary formulas are unavailable.



**Figure 5.** Patient with escharotomy incision of the right arm. The head of the bed should be elevated and the arm elevated to protect against further swelling (ICRC)

## WOUND MANAGEMENT

- » Deep burns of more than 1% will do better with surgery. In ideal circumstances this is best performed early, but **when resources and clinical capability are limited it can be preferable to wait for at least two weeks before embarking on surgery.**
- » The delay will allow more superficial burns to heal with dressings alone and provides confirmation of the initial assessment of depth.
- » This approach helps reduce the total area that requires surgical excision and skin grafting.
- » Burn wounds require dressings. Treatment of burns by “exposure” is not advocated.

## SELECTION OF BURN DRESSINGS

There are numerous methods of dressing a burn wound and there is no universally agreed dressing regime. Policy in disaster and conflict situations should be dictated by the following principles:

- » Dressings must be applicable for all burn depths.
- » Dressings should have antiseptic properties and minimize the drive of the Systemic Inflammatory Response.
- » Dressings should be easy to apply and comfortable for the patient.
- » Dressings should not require frequent changes or laborious nursing care.

## SELECTION OF BURN DRESSINGS

- » In general ointments, such as **Silver Sulfadiazine (SSD)**, are easier to apply than sheets.
- » Preparations of SSD that contain Cerium Nitrate are thought to reduce the systemic effects of a burn wound and also generate a dry eschar that is easier to manage.
- » These ointments should be applied in a thick layer then covered with fluffy gauze.
- » Silver based sheet dressings, can be left on wounds for a longer time and provide ease of management, but are generally expensive.
- » The most basic dressings can be made of paraffin gauze stained with an antiseptic such as povidone-iodine.
- » Dressings must be inspected daily for slippage, comfort and excessive strike-through.
- » Any suspicion of sepsis must prompt an inspection of wounds and exchange of dressings.

### PITFALL

Wounds must be thoroughly scrubbed and cleaned prior to the application of any dressing.

## HAND BURNS

- » Elevation of hand burns is very important to minimize swelling
- » The use of bags to dress hand burns is not used frequently now. The advantage of hand bag dressings was that the awake patient could assist in their own nursing care, particularly in mass casualty situations or long evacuation journeys when the availability of professional staff may be limited.
- » Unconscious or heavily sedated patients should have hands fully dressed as according to the principles described in this text and splinted in the Position of Safe Immobilization (POSI).
- » Circumferential hand burns require careful monitoring for potential escharotomy. **Warning signs** include the hand becoming pale, cool, and assuming a claw like position.
- » If available, a Doppler monitor can be used to assess for a lack of digital flow, if flow becomes absent a digital escharotomy may be required.



Figure 7. Safe position for splinting of the hand (ICRC)

## FACE BURNS

- » Facial burns should be scrubbed as described previously and a petroleum based ointment applied regularly to prevent desiccation.
- » There is no evidence that an antiseptic preparation is superior to plain petroleum jelly for the face.
- » Ears should be covered with an antiseptic agent to prevent chondritis.
- » It is difficult to assess and care for scalp burns unless the head is shaved.

## HYPOTHERMIA

- » Burn patients are at very high risk of hypothermia. This is especially true of children.
- » This may be particularly true in disaster situations where permanent structures may be severely damaged or lacking heat.

## SURGICAL MANAGEMENT OF BURNS

- » If embarking on surgery in constrained situations it is beneficial to perform excision and skin grafting in small stages rather than trying to deal with a large burn wound in a single session.
- » **10% TBSA of burn wound for each theatre session is a good target with 10 – 14 days in between surgeries.**
- » This helps reduce blood loss, minimizes the further physiological insult, and generates more manageable dressings which reduces the nursing workload.
- » It is important to make sure there will be sufficient skin graft available to cover areas planned for excision. It is preferable to have an unexcised burn wound with appropriate dressing rather than an un-grafted excised wound.
- » Excision of burns on the face and hands should be performed by those with specific experience in burn surgery.

### EXPERT TIP

- » Perioperative blood loss can also be reduced by liberal use of 1:1,000,000 adrenalin (epinephrine) solution injected beneath both the burn wound to be excised and skin graft donor areas.
- » This is made by mixing 1mg of adrenalin (1ml of 1:1,000) in 1 L of normal saline.

### SKIN GRAFTING FOR BURNS

- » Skin graft should be routinely **meshed 1.5:1** as this reduces the amount required to be harvested, thereby reducing the size of the secondary wound but also improves the chance of the graft taking.
- » If there is a shortage of donor areas, then a 3:1 mesh can be used.
- » Mesh ratios above this are technically difficult and should be reserved for specialist centres.
- » Donor sites can be re-harvested once re-epithelialized but it is recommended to wait for at least two weeks if the surgeon is not familiar with this.
- » The number of times a given area can be re-harvested is dictated by how much dermis is removed each time.



**Figure 8.** Meshed STSG in place. The graft can be seen on the left side of the picture. The meshing process not only allows for grafting of more TBSA but reduces the chances of hematoma formation under the graft which can lead to graft failure. (ICRC)

- » It is preferable to leave skin graft **donor site dressings** in place until the area has healed, even for several weeks.
- » The routine change of dressings earlier than one week simply causes more pain, bleeding, and damage to the new epithelium.
- » **Skin grafted areas** should have a first change of dressing at five days unless there is a clinical indication to do so earlier, e.g. signs of new systemic infection.

## CHEMICAL BURNS

- » Solid particles or powder can be brushed off first.
- » The injuring agent should then be removed as soon as possible with copious irrigation by water.
- » Irrigation should be prolonged but beware of inducing hypothermia.
- » Once decontamination is complete, the burn wound is treated the same as a thermal burn.
- » Chemical burns can cause a differing inflammatory response from thermal burns so close monitoring of fluid requirements is essential.
- » Sulfur Mustard burns take many weeks to heal and skin grafting is prone to failure. All vesicant burns should be referred for specialist care.

### PITFALL

If more than 40% TBSA requires excision and skin grafting, complex surgical strategies are required.

Patients with over 40% full thickness burns in low resource situations have a very poor chance of survival, particularly in a field hospital environment.

## ELECTRICAL BURNS

- » In the case of electrocution, if an initial ECG is normal there is no evidence to suggest continued cardiac monitoring is necessary in a resource limited environment.
- » Electrical burns can cause much more extensive tissue damage than the skin signs might suggest.
- » Deep necrosis is not uncommon and there should be a very low threshold for performing fasciotomies. It is common to encounter progressive necrosis and full debridement may require a staged approach.

## EMT TYPE 3

- » The majority of burns that require surgery will need long periods of inpatient admission with significant input from nursing and physiotherapy.
- » It will be appropriate to transfer cases to type 3 facilities as soon as such capabilities become available. If possible, type 3 EMTs should integrate with pre-disaster/conflict services.
- » Delivery of specialist multidisciplinary care will be required for burns to the face, hands, perineum/genitals and soles of feet in addition to those with large % TBSA.
- » The organization of such specialist services will need careful planning and control to ensure it does not deliver care that is incongruous with the host nation's capabilities and norms.

## SPECIAL CONSIDERATIONS

- » Burn patients can create difficult decisions regarding end of life care. It is important that an open dialogue occur between, patients, families, and EMT teams in severely burned patients.
- » It may be helpful to have respected members of the local community on the decision making team.
- » These lines of communication are important during transfer as well. Burn care for severe burns often takes months and is very resource intensive. An EMT receiving burn patients should strive to identify a local or regional centre with the experience and resources to treat burn patients.
- » However, patients should not be transferred without discussion with the family and the consent of the patient and family.

## REHABILITATION

- » Rehabilitation of burn patients is a crucial part of the treatment process and should begin as soon as possible.
- » Adequate pain management is compulsory for successful rehabilitation.
- » Wound compression and mobilization should be utilized when recommended by the surgeon.
- » Late stage rehabilitation is not terribly complex, but like all of burn surgery, professionals trained in burn care are necessary to obtain the optimal aesthetic and functional outcome.

### PITFALL

Burn injury is distracting and other injuries must be identified and treated along with the burn injury. Primary and secondary surveys for trauma are required in burn patients as in all trauma patients.

## SUGGESTED RESOURCES

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EMT Website: <https://extranet.who.int/emt/page/home>  
 AO/ICRC/WHO Training Resources: <http://www.aofoundation.org/icrc>