

SEEKING CLARITY IN MINOR BURN MANAGEMENT

Burn injuries pose a challenge due to the different causes and variability of injury severity. Accurate assessment is a critical aspect of initial burn management. Non-specialist healthcare professionals lack formal education, and have limited knowledge and little confidence in assessment and management of burns. This is further compounded by a lack of consensus from burns specialists on key aspects of burn care.

“A burn is a skin injury caused by heat, electricity, chemicals, light, radiation or friction.”

Burn injury is one of the most devastating forms of trauma that a person can experience (National Burn Care Review [NBCR], 2001). Each year, approximately 130,000 people with burn injuries visit emergency departments in England and Wales and 250,000 present to primary care teams (NBCR, 2001; London Health Programmes, 2011). The majority (80%) of these are minor burns and can be managed successfully by non-specialist healthcare professionals in the home or in primary or secondary care (Alsbjörn et al, 2007). However, the initial management of these injuries can be distressing and challenging for non-specialist clinicians, with many feeling fearful about providing emergency care for burn victims (Froutan et al, 2014).

What is a burn?

A burn is a skin injury caused by heat, electricity, chemicals, light, radiation or friction (*Box 1*). Burns involve different skin layers and may affect deeper structures such as muscle and bone. The severity is usually classified by the percentage of total body surface area (TBSA) affected by the burn and the depth of the injury. Ranging from the minor

burn to the devastating injury, burn trauma can lead to infection, pain and scarring and affect all aspects of a person's life, including their aesthetic appearance; psychological, social and physical functioning; and relationships with others (Falder et al, 2009). The quality of initial management can greatly influence the long-term consequences, so it is essential for all clinicians involved in the care of patients with burn injuries to understand how interventions can affect healing and patient outcomes.

Challenges to care

NBCR (2001) recognised that a large number of minor burn injuries are assessed and cared for outside of the burn speciality by a wide range of healthcare professionals.

“The very first doctor to see a burn patient immediately after the injury occurs is rarely a physician whose main interest is burn medicine” (Muehlberger et al, 2010).

Accurate assessment of depth and burn size is known to be a critical aspect of the initial burn management because this guides both the immediate clinical management and subsequent need for referral to the

local specialised burn service. This poses a significant challenge to non-specialist healthcare professionals, who lack formal education and training in burn injury first aid, assessment and treatment, leading to limited knowledge and confidence in assessment and management of burns. Many authors have highlighted this issue:

- ▶ “There is a major lack of burns teaching in the United Kingdom” (Egro, 2014)
- ▶ “Staff members of emergency departments and ambulance stations lack knowledge regarding the emergency management of burn victims” (Breederveld et al, 2011)
- ▶ “Assessment of burns by non-specialists is difficult and can be inaccurate” (Chipp et al, 2008).

It is not surprising, then, that non-specialist healthcare professionals often feel out of their depth in caring for burns patients, particularly children. Standardised approach to burn injury management with clear clinical guidelines would not only relieve anxiety regarding burn management, but also improve the overall quality of care for burn-injured patients and improve timely access to specialised services (Allison, 2002)

- ▶ “Closer liaisons with the burn unit could improve quality of patient care and help to reduce strain on ED returns” (Rose et al, 2010).

In response, the London and South East of England Burn Network (LSEBN) has developed innovative Burn Care Advisor posts across each of its four specialised burn services. These offer standardised, high-quality, evidence-based, multiprofessional training, education and feedback to all pre-hospital, primary and secondary services within the LSEBN catchment area, in relation to the initial assessment, management and referral of patients with a burn injury. Other burn care networks across England and Wales have adopted a similar

approach. This has bridged the gap between emergency, community and specialist services, offering patients with burn injuries access to timely and specialist-guided treatment, regardless of where they receive their initial care (Stiles, 2014).

Non-specialist clinicians report a lack of understanding of most aspects of burn care, including:

- ▶ Burns first aid
- ▶ Burn blister management
- ▶ Analgesia
- ▶ Burn assessment
- ▶ Burn dressings
- ▶ Criteria for referral to a specialised burn service.

Burns first aid

The British Burn Association’s *First Aid Position Statement* offers a nationally agreed consensus regarding optimum first aid for burns and scalds, establishing a practical and effective guide for the home or hospital environment (BBA, 2014). The BBA advises that the best first aid for burns should consist of cool running tap water at 2°C to 15°C for 20 minutes, applied as soon as possible, but still effective up to 3 hours after injury. Clothing and nappies can retain heat, and jewellery can restrict blood flow to the swelling injury site and should always be removed early. Efforts should be made to minimise heat loss when using cool water, treating only the burn area, while keeping the rest of the patient warm (Alsbjörn et al, 2007). A cooled burn wound should be covered with loose strips of plastic wrap to prevent infection and relieve pain from exposed nerve endings until it is possible to perform a definitive wound assessment.

Burn blister management

A burn blister is a “fluid-filled swelling occurring under the skin, usually as a result of heat damage” (Morris, 2008). Burns specialists have struggled to reach consensus on the subject of burn blister management, with great variation in practice between

Box 1. Types of burns and scalds.

- ▶ Flame burns
- ▶ Scalds (hot liquids)
- ▶ Contact burns (hot solid)
- ▶ Flash burns (resulting from brief exposure to intense heat)
- ▶ Electrical burns (high and low voltage)
- ▶ Lightning strike burns
- ▶ Chemicals (acids or alkalis)
- ▶ Sunburn
- ▶ Radiation burns
- ▶ Friction burns.

services. The argument for leaving blisters intact suggests that the blister functions as a biological dressing, reduces the risk of contamination and infection, and provides an optimal moist environment for healing. The argument for deroofting and debriding blisters is that the blister fluid contains substances that impede wound healing, providing a perfect environment for bacterial growth (Toussaint and Singer, 2014).

Although the clinical evidence for deroofting blisters is poor, it is impossible to accurately assess burn depth and size without deroofting (Alsbjörn et al, 2007; Enoch et al, 2009; Wounds International, 2014). It is paramount to administer appropriate analgesia first and allow it time to take effect before deroofting. A debridement method that reflects the skill of the healthcare professional, is appropriate to the location of

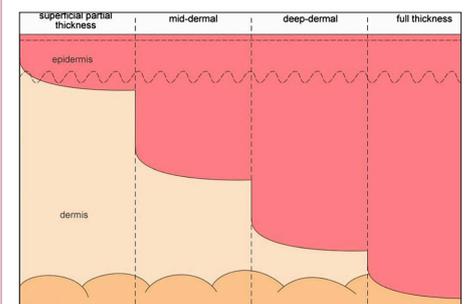


Figure 1. Classification of burn depth (Durrant et al, 2008).

the wound and removes intact or collapsed blisters should be used.

LSEBN (2011) has published a consensus statement on burn blister management with a recommendation that burn blisters greater than the size of the patient's little fingernail should be deroofed in order to:

- ▶ Allow assessment of burn wound bed
- ▶ Remove non-viable tissue
- ▶ Prevent uncontrolled rupture of blister
- ▶ Avoid risk of blister infection
- ▶ Relieve pain in tense blisters
- ▶ Reduce restriction of movement of joints.

Deroofing procedure exposes the nerve endings in the wound bed, causing an increase in pain. An experienced clinician will anticipate this with pre-emptive analgesia and by having dressings ready to apply. Prompt application of an appropriate non-adherent dressing will support wound healing and provide comfort.

Analgesia

Burns are painful wounds, causing distress to patients at the point of injury and during wound care and therapy. Deep burns destroy the

nerves, causing reduced or absent sensation at the injury site. Patients are often pleased to report that they are comfortable and have no pain from their burn wound, which clinicians must realise is a sign suggestive of a deeper burn injury, which will not heal independently without surgical intervention. Nerves undamaged by the burn injury will transmit pain, as will new nerves that grow as part of the wound healing process. This is why pain management in burn patients presents an ongoing challenge, as patients struggle to comprehend why their burn injury pain often increases over time, before healing is achieved.

Good pain control depends on continuous assessment throughout wound care or therapy procedure, with prompt analgesia titrated to effect. It is essential that all patients have appropriate analgesia that has been given time to take effect before any wound care procedure is carried out. Wound cleansing, blister debridement, dressing changes and therapy interventions will all intensify the pain experienced by the patient (Wounds International, 2014). Burns first aid, pre-emptive analgesic control and application of atraumatic

dressings will greatly help relieve pain from exposed nerve endings.

Burn depth assessment

Burn injuries are classified according to the amount of tissue loss (Butcher and Swales, 2012; *Figure 1* and *Table 1*). They can be described as:

- ▶ Superficial: the burn affects only the epidermis, presenting without blistering and healing rapidly.
- ▶ Superficial partial thickness: the injury extends into the uppermost layers of the dermis and papillary dermis, presenting with blistering and pain from exposed nerves. These wounds have the regenerative capacity to heal within 10 days.
- ▶ Deep dermal: the burn extends into the deeper layers of the dermis, but not as far as subcutaneous tissues. The healing is prolonged and can result in scarring, contractures and loss of pigmentation.
- ▶ Full thickness: these burns cause the most debilitating damage by extending through all the skin layers and underlying structures, such as subcutaneous tissues, muscle and bone. The tissues appear inelastic, waxy and leathery, and the injury is likely

Table 1. Classification of burn depth (Wounds International, 2014).

Burn type	Appearance	Blisters	Capillary refill/ blanching on pressure	Sensation	Treatment
Superficial erythema	Red	Not present	Brisk	Painful	Usually heals within 7 days with conservative treatment No scarring
Superficial partial thickness	Red/pale pink	Large blisters	Brisk, but with slower return	Painful	Usually heals within 14 days with conservative treatment No scarring
Deep dermal	Dry, blotchy/mottled and cherry red/stained appearance	May be present	Absent	Variable	Although can heal with conservative treatment, complex burns may require surgical intervention Possible scarring
Full thickness	Dry, leathery, white or black (charred) Eschar may be present	Not present	Absent	Absent	Complex full thickness wounds seldom heal with conservative treatment. Usually requires surgery.

to require surgery in order to heal. Considerable scarring and contraction is likely in a burn injury of this depth.

As a general rule, if the burn wound has good sensation, then the nerve endings are undamaged; if it has brisk capillary refill, then the blood vessels are supplying the wound with nutrients and oxygen essential for healing. A wound like this is likely to heal with conservative management without the need for surgery.

Burn-area assessment

The area affected by a burn injury is expressed as a percentage of the TBSA (%TBSA), which allows clinicians to establish the severity of the burn. Calculation of the burn surface area includes only areas of skin loss and does not include erythema.

There are three useful methods for estimating the burn area (Butcher and Swales, 2012). Clinicians are encouraged to use a method they are most comfortable and confident with:

- ▶ Palmar surface — the surface area of the patient’s palm with adducted fingers is approximately 1% TBSA (Figure 2). This method is useful in estimation of smaller burns (<15%) or can be used in severe burns (>85%) to calculate unburnt skin.
- ▶ Wallace’s “rule of nines” — this is a useful tool for estimating moderate to severe burns in adults, where the body is divided into areas of 9% and the %TBSA is calculated. Estimates using the rule of nines in children may be inaccurate

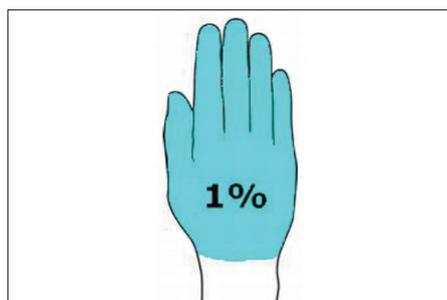


Figure 2. Palmar surface is a useful measurement in smaller burns.

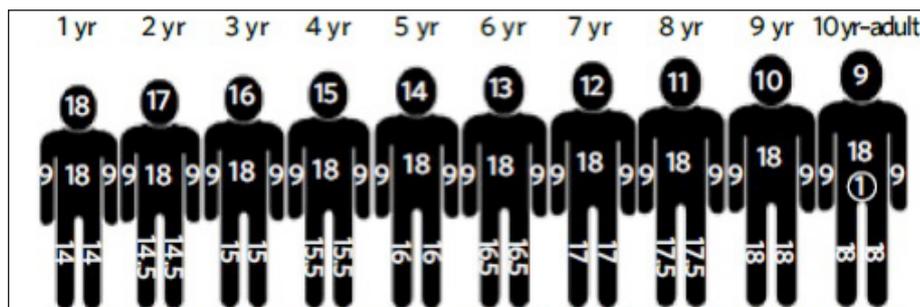


Figure 3. Paediatric-Adult Burn Assessment Ruler (copyright Mike Fuery).

unless the clinician is familiar with specific age-related differences for this method, which may be assisted by using the Paediatric-Adult Burn Assessment Ruler (Figure 3).

- ▶ Lund and Browder chart — the most accurate method for assessing burn area. Charts are available in baby, 2, 5 and 10 years, and adult age groups, compensating for variation in body shape with growth. The clinician is required to shade the areas of the burn on the chart. A calculation of %TBSA may be made by adding shaded areas together. If used correctly, it provides the most universally used assessment tool for burns area in adults and children (Figures 4a and 4b).

Dressing the wound

In the first few hours of a burn injury, the patient is likely to require frequent wound interventions: application of first aid, deroofting of blisters, and assessment of capillary refill and sensation. Plastic wrap (polyethylene) is recommended for use in burn wound care, as it is pliable,

non-adherent, impermeable, and transparent for inspection (Australian & New Zealand Burn Association, 2015). Plastic wrap offers the best choice of wound covering during the early stages of treatment and for transfer to the specialist burn service. It should be applied in loose longitudinal strips directly over the burn wound to avoid constriction. Upon arrival to the burn service, the wound will need to be reassessed and all dressings used for transfer will be discarded, which makes plastic wrap the most cost-effective option.

No topical creams should be applied to the acute burn wound because they mask the injury, make the assessment of the wound challenging, and have to be removed to enable accurate review, which can be painful. The silver sulfadiazine cream (Flamazine®, Smith & Nephew) is frequently used in burn wound care as an antibacterial agent and is effective against Gram-negative bacteria. Silver sulfadiazine should be applied topically only following specialist review and guidance.

Burn wounds are unlikely to be infected at first acute presentation

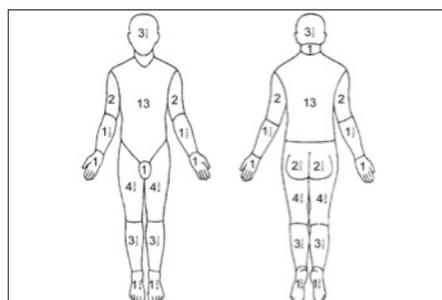


Figure 4a. Adult Lund and Browder chart.

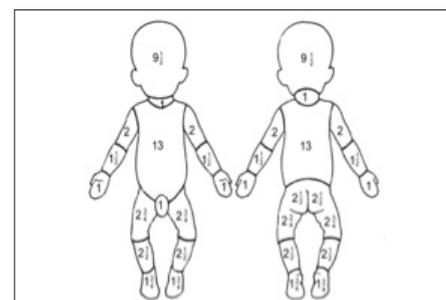


Figure 4b. Baby Lund and Browder chart.

and, therefore, prophylactic antibiotics are contrary to current best practice advice (Alsbjörn et al, 2007). Any burn wound that shows signs of infection or remains unhealed 2 weeks post-injury should be referred directly to the local burn service.

Burn wounds produce a large amount of exudate during the first few days after injury, which influences the choice of dressings. Alsbjörn et al (2007) describe essential characteristics that are important in burn wound dressings:

- ▶▶ Maintains moist wound environment
- ▶▶ Contours easily
- ▶▶ Non-adherent, but retains close contact with the wound
- ▶▶ Easy to apply and remove
- ▶▶ Painless on application and removal
- ▶▶ Cost-effective
- ▶▶ Protects against infection.

Initially, burn wounds should be covered with a non-adherent primary dressing and an absorbent secondary dressing to manage excess exudate. Burn wounds should be reviewed within 3 days of injury and thereafter, according to the dressing type used. Although dressing selection will depend on local availability, it is crucial that healthcare professionals be familiar with the characteristics, advantages and limitations of the dressing products at their disposal in order to select those that will achieve the best outcomes for each patient.

Criteria for referral to a specialised burn service

Many patients with burns who would benefit from specialist burn care are managed outside specialist burn services (NBCR, 2001). In response, the National Network for Burn Care (2012) has produced clear referral guidance for complex burns that require assessment and management in a specialist burns service (Table 2). LSEBN (2010) has interpreted this guidance with some variation,

Table 2. National burn injury guidelines for referral to a burns unit (National Network for Burn Care, 2012).

Cause	<ul style="list-style-type: none"> ▶▶ All burns with inhalation injury ▶▶ All full-thickness burns ▶▶ All electrical burns ▶▶ All chemical burns ▶▶ All friction burns ▶▶ All cold-injury burns ▶▶ All burns with trauma
Affected area	<ul style="list-style-type: none"> ▶▶ All burns to hands, feet, face, perineum or genitalia ▶▶ All circumferential burns to limbs, trunk, neck or digits
Size	▶▶ All burns ≥2% total body surface area in children or ≥3% in adults
Wound	<ul style="list-style-type: none"> ▶▶ Any burns not healed within 2 weeks ▶▶ Any changes in appearance of the burn wound ▶▶ Any signs of infection ▶▶ Any concerns regarding healing
Discuss	<ul style="list-style-type: none"> ▶▶ Any burns with suspected non-accidental injury ▶▶ Any unwell/febrile child with a burn ▶▶ Any concerns regarding burn injuries and co-morbidities that may affect treatment or healing of the burn ▶▶ Any suspicion of toxic shock syndrome
Advice	<ul style="list-style-type: none"> ▶▶ If the above criteria/threshold is not met, then continue with local care and dressings as required ▶▶ If non-specialised practitioners require advice regarding the assessment, care or treatment of any type of burn injury, they can contact their nearest specialised burn service at any time ▶▶ A list of the specialised burn services in England and Wales is available at: http://www.britishburnassociation.org/burns-units

allowing referring services to consider referring or to simply seek specialist advice (LSEBN, 2010a; 2010b). This approach encourages non-specialist clinicians in primary and secondary care to seek advice early, directly from the local burn service. A timely referral to a specialist service ensures that patients with potentially significant, life-changing burn injuries are cared for by experienced healthcare professionals, who are familiar with longer-term outcomes in burn patients.

The Telemedicine Referral Image Portal Service (TRIPS) has been developed and utilised in the LSEBN catchment area. This enables wound images to be transferred via a secure portal, allowing referring hospitals, paramedics and healthcare professionals to link directly with

their local burn service. As a result, burn specialist services have become more accessible, enabling appropriate, patient-centred advice to be provided to clinicians and reducing the number of patients who are inappropriately transferred to a burn service, thus ensuring the right care is delivered closer to home.

Conclusion

Despite the challenging nature of burn injuries, many non-specialist clinicians assess and care for these complex patients as part of their everyday practices. Formal burns training and education is now supplemented by the burn care advisors across LSEBN, facilitating a coordinated and consistent approach to emergency burn care with the aim that all patients with burn injuries in the area will have access to timely and specialist-guided

treatment, regardless of where they receive care. Clear management and referral guidelines, direct access to the specialised burn service via TRIPS and a standardised approach to burns training will improve non-specialist clinicians' knowledge and confidence in assessment, management and referral of burn injured patients. As a result, timely, appropriate and effective care is delivered to the patient when they need it most, which will have a positive impact on outcomes and quality of life. **WE**

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Glossary.

Burn eschar: inelastic dead tissue which forms as a result of deep dermal or full thickness burn injury.

De-roofing: removal of the damaged, non-viable epidermal skin layer that forms the 'roof' of the blister.

Total body surface area (TBSA): Expressed as a percentage, TBSA reflects the body area affected by the burn injury.