Clinical Practice Guidelines: Trauma/Burns

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Date	July, 2022
Purpose	To ensure a consistent approach to the management of a patient with burns.
Scope	Applies to Queensland Ambulance Service (QAS) clinical staff.
Health care setting	Pre-hospital assessment and treatment.
Population	Applies to all ages unless stated otherwise.
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Burns

July, 2022

Most **burn injuries** are a result of flame burns or scalds, while electrical and chemical burns are less common.[1] Concomitant blast injuries can accompany explosions and need to be considered when assessing a patient with major burns.

Burns can cause a wide range of injuries. In the acute setting, airway burns and inhalation injury can lead to respiratory compromise. With major burns, fluid and electrolyte abnormalities develop over several hours, that can lead to shock.[2]

Fires in enclosed spaces pose further danger from the production of potentially lethal toxic gases (e.g. carbon monoxide and cyanide).[3]

Clinical features

Depth of burn

Accurate burn-depth assessment can be difficult, as most burns usually have a mixture of different depths.[4] Burn depth assessment has implications in guiding treatment, but lengthy assessment in the pre-hospital setting is not required.

Depth	Appearance	Sensation
Superficial	Erythema, brisk cap refill	Painful
Superficial dermal	Moist, reddened with blisters, brisk cap refill	Painful
Deep dermal	White slough, reddened and mottled, sluggish or absent cap refill	Painful
Full thickness	Dry, charred, whitish, absent cap refill	Painless

Risk assessment

Ensure safety for self and bystanders.

Life threats

Respiratory compromise can manifest quickly in airway and inhalation burns. Early endotracheal intubation is required to ensure airway patency.[5]

Consider the possibility of an airway or inhalation burn in the presence of:

- Facial/oral burns
- Singed nasal hair
- Carbonaceous sputum
- Tachypnoea, stridor, hoarseness

Hypovolaemia does not manifest from burns acutely but develops over many hours. The presence of circulatory shock in the early stages of a burn implies an associated injury (e.g. blast injury).

However, major burn patients are at risk for multi-organ failure due to fluid losses and inflammatory processes. Fluid resuscitation should commence as soon as it is safe to do so. For airway and facial burns, fluid resuscitation should commence as soon as the airway is secure.

Features of carbon monoxide and cyanide toxicity should be sought if the patient was trapped in an enclosed space with the potential for significant smoke inhalation.[3]

Circumferential burns to the torso may restrict ventilation, requiring urgent surgical intervention.

Major burns without airway involvement are also a life-threatening injury.

Limb threats

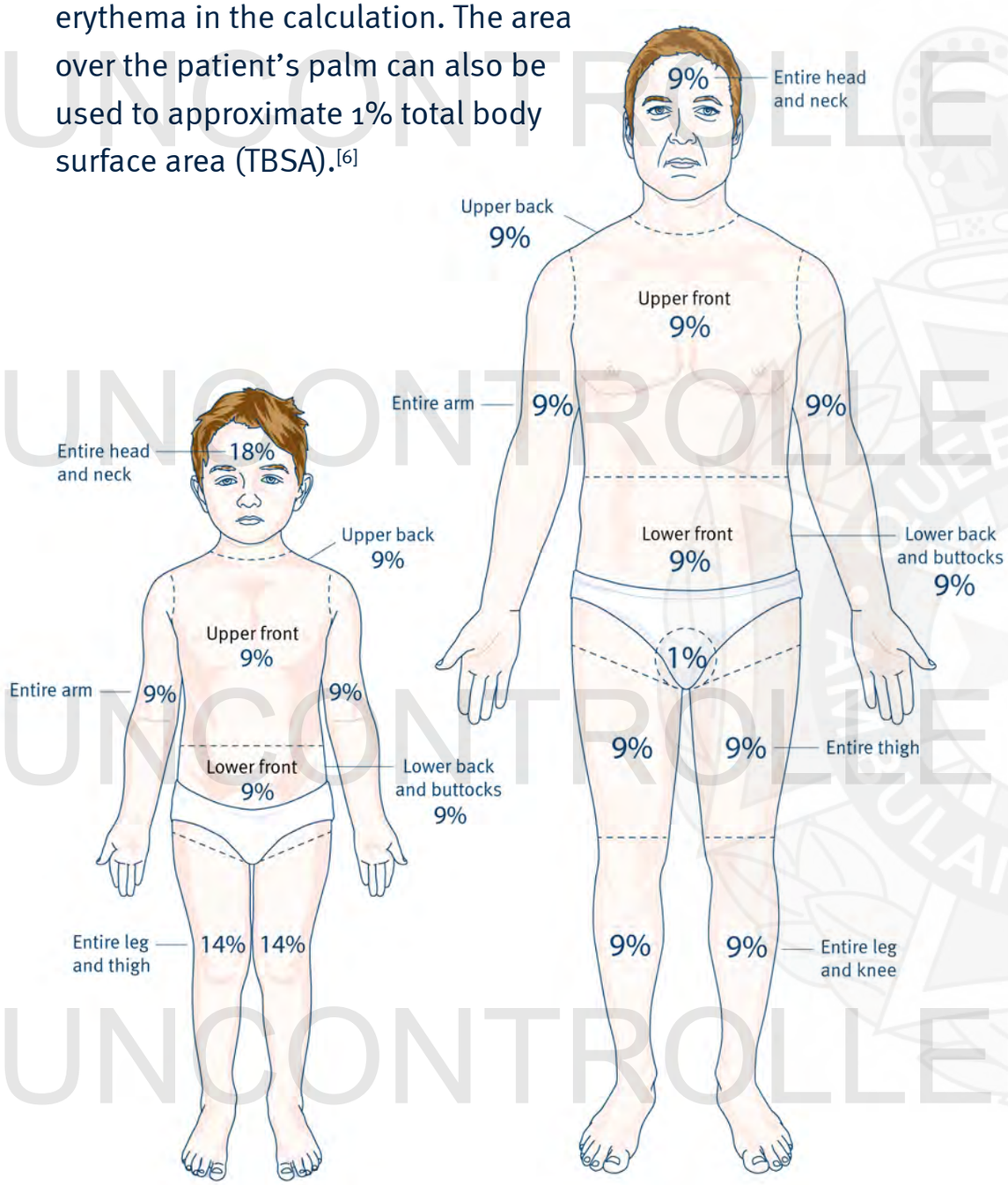
Deep dermal and full thickness burns cause inelastic dead tissue, referred to as eschar. Circumferential burns may compromise limb vascular supply leading to ischaemia if untreated. Limbs with circumferential burns are at risk of vascular compromise.[4,5]

Additional information

- Burns requiring management in a dedicated burns unit:[6,7]
  - Partial thickness burns > 20% all ages; or > 10% in patients younger than 10 or older than 50.
  - Full thickness burns > 5%
  - Burns involving face, eyes, ears, hands, feet, genitalia, buttocks, perineum or overlying a major joint
  - All inhalation burns
  - All significant electrical burns
  - Burns in people with significant co-morbidities (e.g. heart failure)
- Large volumes of fluid increase the risk of interstitial oedema and tissue swelling, potentially increasing the difficulty of endotracheal intubation.[5]
- Fluid resuscitation should be commenced as soon as possible.
- The 'PHIFTEEN-B' formula must be used for calculating fluid resuscitation volume (refer to *DTP: Sodium chloride 0.9%*).
- Hypothermia must be avoided in major burn injury[5] – cool the burn, warm the patient.
- In the paediatric population, consider non-accidental causes as a mechanism for burn injuries.[8]
- Escharotomies are surgical incisions through burnt eschar to release tissue pressure in circumferential limb or thoracic burns. They are best performed in hospital by electrocautery as the wounds tend to bleed. They may be necessary in the pre-hospital environment in situations where there is imminent limb or ventilatory compromise.[4]

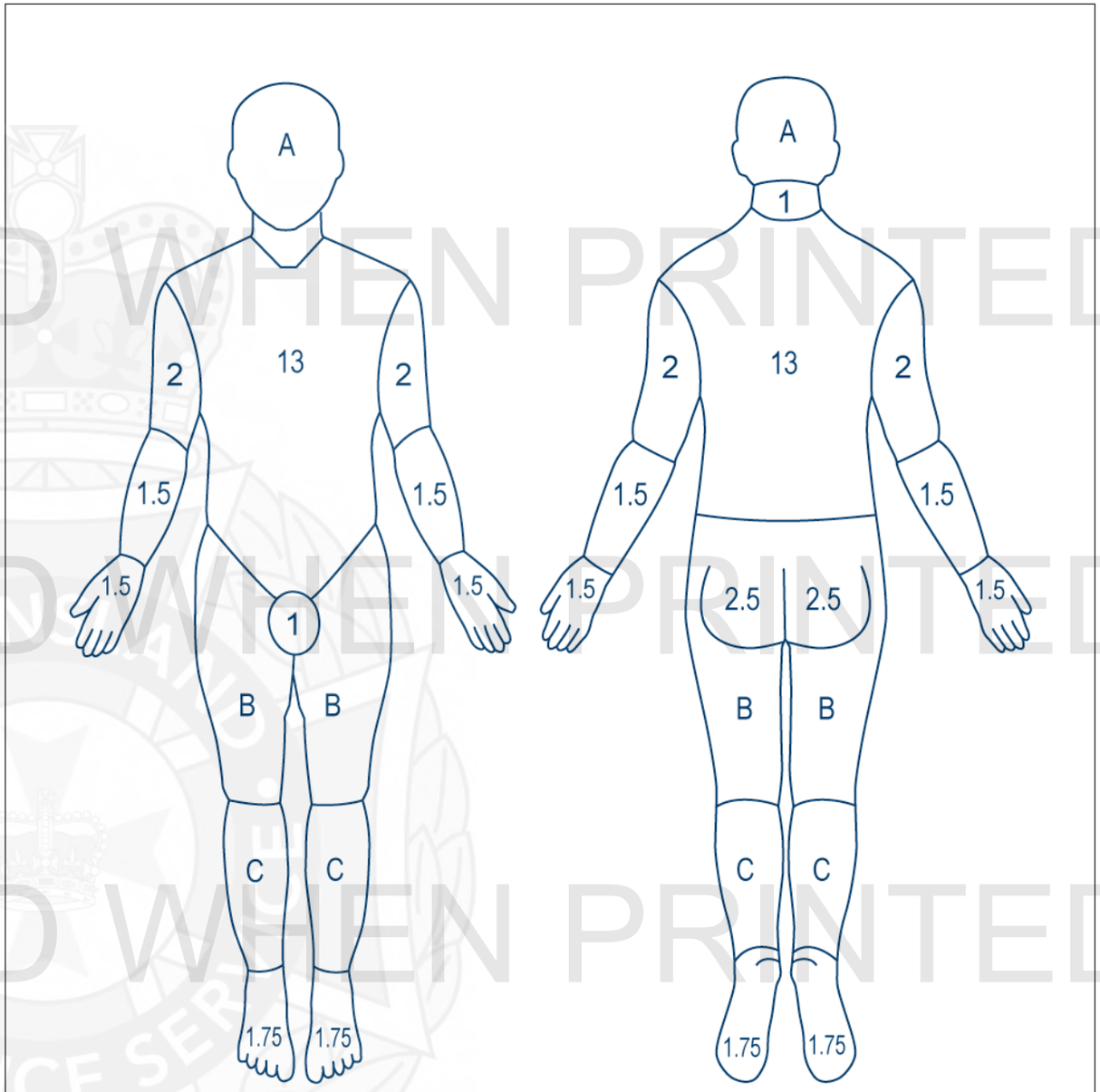
Estimation of surface area affected

The total area burnt can be estimated with the *Wallace rule of nines*, or the more complicated, but more accurate, *Lund Browder burn chart*. Do not include skin with just isolated erythema in the calculation. The area over the patient's palm can also be used to approximate 1% total body surface area (TBSA).[6]



Wallace rule of nines

Lund Browder burn chart



AREA	Age 0	Age 1	Age 5	Age 10	Age 15	ADULT
A: half of head	9.5	8.5	6.5	5.5	4.5	3.5
B: half of one thigh	2.75	3.25	4	4.5	4.5	4.75
C: half of one leg	2.5	2.5	2.75	3	3.23	3.5

CPG: Clinician safety
CPG: Standard cares

- Active cooling with running water for at least 20 minutes, as required (maximum of 60 minutes)
- Protect against hypothermia (COOL THE BURN, WARM THE PATIENT)
- Early airway assessment and management if required

Consider:

- Oxygen
- IPPV
- Analgesia
- IV fluid (use PHIFTEEN-B formula)
- Frequent airway assessments
- Midazolam

Consider:

- Covering burns with cling wrap
- Burn Aid dressing only if:
  - Less than 5% TBSA in paediatric patients or less than 10% TBSA in adult patients
  - No circumferential burns or burns requiring management in a dedicated burns unit (refer to Additional Information section)

Transport to hospital
Pre-notify as appropriate

Note: *Clinicians must only perform procedures for which they have received specific training and authorisation by the QAS.*