

WOMEN'S HEALTH AND PAEDIATRICS  
PAEDIATRIC DEPT

**Burns and Scalds**

Amendments			
Date	Page(s)	Comments	Approved by
April 2016	New Guideline		
March 2018		Whole document review	Paediatric Guideline Group

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**In Consultation with:**

**Ratified by:** Paediatric Guidelines Group

**Date Ratified:** April 2016

**Date Reviewed:** March 2018

**Next Review Date:** March 2021

**Target Audience:** Doctors, nurses and support staff working in Paediatrics

**Impact Assessment Carried Out By:**

**Comment on this**

**Document to:** Dr Erin Dawson, Associate Specialist Paediatric Emergency Medicine

- 70% are pre-school children, most common 1-2 years.
- Scalds mostly under 4 years.
- Boys more likely to suffer burns and serious scalds.
- Most fatal burns occur in house fires and cause of death is usually smoke inhalation.

### **Aetiology of Paediatric burns injuries (percentage)**

Scalds (60) Flame (25) Contact (10) Electrical (2) Chemical (2) Sunburn (1)

### **Pathophysiology**

- Severity determined by temperature and duration of contact.
- Scalds with liquids at higher temp e.g. hot fat or steam, or in children incapable of minimising contact time result in more serious injuries.
- Flame burns involve high temps and produce most serious injuries.
- Electrical injury cause deep burns - arrhythmias may occur and high voltage injuries may lead to rhabdomyolysis and renal failure.
- Chemical burns may progress to cause deeper injury if the chemical is not fully removed.

### **Primary survey and resuscitation**

#### **Airway and cervical spine**

- Airway compromise either due to inhalational injury (Hx of exposure to smoke in a confined space, deposits round mouth or nose or carbonaceous sputum) and oral scalds or severe burns to the face.
- NB airway can deteriorate rapidly, important to secure as early as possible.
- Any suspicion of cervical spine injury or if hx unobtainable, c spine is immobilised until injury ruled out.

#### **Breathing** (All children should have high flow oxygen)

- Abnormal rate, chest movement, cyanosis (late sign).
- Circumferential burns to chest or abdomen may mechanically restrict chest movement.

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- Intubation and ventilation should be commenced if there are signs of breathing problems.

### Circulation

- Shock in the first few hours rarely due to burns, other sources should be actively sought.
- IV/IO access x 2 on unburnt skin if possible.
- FBC U&E Glucose and cross matching before commencing resuscitation.

### Disability

Reduced conscious level may be due to hypoxia, hypovolaemia or head injury.

### Exposure

Exposure should be complete, but burned children lose heat rapidly so should be kept warm and covered up when not being examined.

### Secondary survey

Other injuries include effects of blast, being hit by falling objects or falling trying to escape from fire. Injuries should be treated according to priority.

### Assessing the Burn

- Severity depends on relative surface area and depth. Burns to particular areas require special attention.
- Surface area is estimated using paediatric burns chart.
- If not available the area of **the child's** palm and adducted fingers is approximately 1% of body surface.

NB Erythema is not included in the assessment of percentage of surface area.

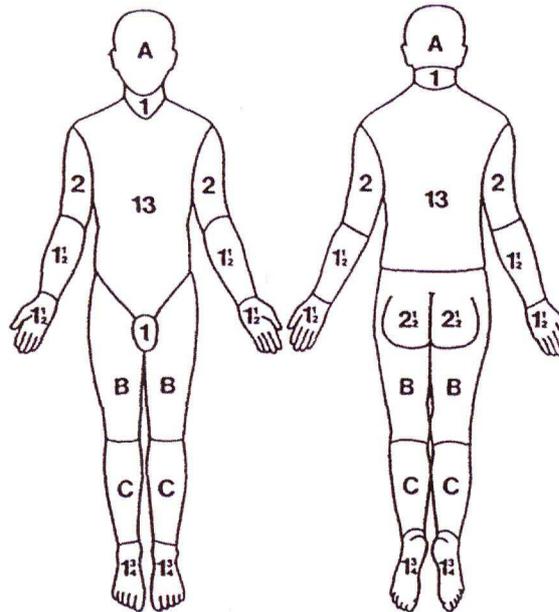
### Depth

- Superficial-affects epidermis erythema only.
- Partial thickness also affects the dermis leading to blistering.
- Full thickness affects both dermis and epidermis, and sometimes deeper structures.

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- Skin looks white or charred and is painless or leathery to touch.

THE BURNED OR SCALDED CHILD



**Figure 18.1.** Body surface area (percent). (Reproduced courtesy of Smith & Nephew Pharmaceuticals Ltd)

Area indicated	Surface area at				
	0 year	1 year	5 years	10 years	15 years
A	9.5	8.5	6.5	5.5	4.5
B	2.75	3.25	4.0	4.5	4.5
C	2.5	2.5	2.75	3.0	3.25

**Special areas**

- Face and mouth - airway problems.
- Hands and feet - severe functional loss.
- Perineum - risk of infection.
- Circumferential (full or partial thickness burns) to limbs or neck-ischaemia, require urgent incision.
- Circumferential burns to torso may restrict breathing.

**Emergency treatment**

**Analgesia** – Entonox, I/N diamorphine, IV Morphine, Paracetamol, Ibuprofen

**Fluid therapy**

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- 20ml/kg Normal saline bolus for shock as required.
- Burns of 10% or more require additional fluid as well as their normal fluid requirement.
- Additional fluid is calculated according to the Parkland formula:

$$- \text{Percentage burn} \times \text{weight (kg)} \times 4 / 24 \text{ hrs}$$

For first 8 hours:  $0.25 \text{ mls} \times \% \text{ Burn} \times \text{weight (kg)} = \text{mls/hour Hartmann's solution}$

Next 16 hours:  $0.125 \text{ mls} \times \% \text{ Burn} \times \text{weight (kg)} = \text{mls/hour Hartmann's solution}$

Most children do not require maintenance fluids, refer to LSEBN for further information.

Children with major burns and/or inhalation or other serious injuries will be transferred to the appropriate PICU.

These children will usually be catheterised and subsequent IV therapy will be guided by urine output which should be  $> 2\text{ml/kg/hour}$ .

### Wound care

- Aim to avoid pain due to air passing over wound, and to avoid infection.
- Cold compresses or irrigation should be for 10 minutes only to avoid hypothermia, and only in children with less than 10% of superficial or partial thickness burns.
- Cling film can be applied loosely without additional cream or ointment for transfer.
- No child should be transferred with cold soaks in place.
- Superficial burns usually heal within 14 days and leave minimal scarring.
- Deep burns take a prolonged time to heal and leave severe scarring.

### Minor burn injury

- Burn debris should be removed with normal saline.
- The dead skin of open blisters should be removed and large or friable blisters should be deroofed.
- All burns are susceptible to infection but antibiotics are not routinely prescribed.
- The child's tetanus status should be checked.

### Dressings

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- Dressings such as Adaptic Touch can be used on simple burns, and covered with a non-adherent pad e.g. Release.
- In bigger burns, several layers of dressing are usually required to absorb exudates and to prevent shear or friction of the skin.
- Dressings are changed and the burn reviewed after 48 hours and thereafter every 2-3 days depending on the rate of healing.
- The first review is usually in A&E, but after this, an uncomplicated burn can be dressed by the practice nurse at the GP surgery, or in the walk-in centre.
- Once a burn is healed, the area should be moisturised regularly, and protected from exposure to the sun.
- Physiotherapy may be required to prevent burn contractures.

### **Management of carbon monoxide poisoning**

- Inhalation of CO produces carboxyhaemoglobin which has a 200 fold greater affinity for oxygen than haemoglobin, therefore a high level of CO will cause cellular hypoxia.
- Normal pulse oximetry does not exclude CO poisoning, and blood carboxyhaemoglobin should be measured in children who have been in house fires.
- Levels of 5 - 20% are treated with O<sub>2</sub> which speeds up the removal of CO.
- Higher levels should be discussed with the specialist burns unit as hyperbaric oxygen chamber treatment may be required.
- Cyanide poisoning may occur in some situations with burnt plastics, wool and silk. Advice should be sought from the poisons unit if cyanide poisoning is suspected.

**Definitive Care requires transfer to a paediatric burns facility –please use the London and the South East of England Burns Network Burns Transfer Information Form available on the intranet.**

- [LSEBN Cover Letter](#)
- [LSEBN Referral Guidelines](#)
- [LSEBN Transfer](#)

### **Criteria for transfer to a burns unit**

- 1% Total Body Surface Area (TBSA) Partial thickness (PT) burn

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- All deep dermal and full thickness (FT), circumferential burns and burns involving the face, hands, soles of feet or perineum
- All burns associated with smoke inhalation, electrical shock or trauma
- Severe metabolic disturbance
- Children with burn wound infection
- All children 'unwell' with a burn
- Unhealed burns after 2 weeks
- Neonatal burns of any size
- All children with burns and child protection concerns
- Progressive non burn skin loss condition (TENS, SSSS)
- Any other case that causes concern

**Always consider non-accidental injury if delay in presentation, history inconsistent with examination or with the child's developmental level.**

**If in doubt discuss with burns unit.**

*Ref: ABC of wound healing Burns BMJ volume 332 p 649-652*

*APLS 2004 Chapter 18 p199-204*