PAEDIATRIC BURNS: RESUSCITATION (MODERATE - SEVERE / COMPLEX)

BURNS = TRAUMA Call trauma team and prepare resuscitation environment ***For **First Aid** advice see page 2***

Follow C-Spine-ABC trauma algorithm, especially for those with burns > 10% TBSA
Prepare environment: Warm room/ fluids, consider further burn cooling (30m cooling in first 3 hrs post burn)
History: Full history of mechanism, first aid, social & any safeguarding concerns
Examination: Primary survey inc. full set of observations (HR, RR, SpO_2, BP, Temp)
Resuscitation / First Aid: As necessitated by primary survey / pre-hospital burn cooling measures
Estimate % Total Body Surface Area (TBSA) of burn: (see Lund & Browder chart on page 2)
Investigations: Gas (Lac, COHb, MetHb, Glu), FBC, U&E, CK, Group & Save, imaging as indicated

CALCULATE % TBSA
- Lund & Browder Chart (see below)
- Mersey Burns App
- Estimate 1% = area of child's hand

Moderate / Severe ⩾ 15%

EVALUATE FOR FEATURES OF COMPLEX BURNS
SITE: Face / eyes / hands / feet / joints / perineal / circumferential
DEPTH: Any full thickness (non-blanching, leathery/dry, painless)
MECHANISM: Chemical, radiation, electrical
AGE: < 5 years, especially neonates < 28d

A **Assess AIRWAY & C-Spine risk**
- **SUSPECT inhalational burns if:** Respiratory distress, stridor or voice changes, soot around nose/mouth, drooling, upper airway oedema or ulceration, facial or neck burns, exposure to fire in enclosed space, steam inhalation
- **Other airway risk factors:** Electrical burns, > 25% TBSA, low or falling GCS
- **Management:** Sit up if C-spine clear, early anaesthetic assessment, prepare for early intubation, do not cut ETT (allows for progressive swelling) and record length at fixed landmark, cotton ties if facial burns
- Avoid Suxamethonium for induction of anaesthesia due to hyperkalaemia risk

B **Assess GAS EXCHANGE**
- Causes of respiratory failure in burns are: chest wall restriction from eschar, inhalational injury, PARDS and chest wall injury
- **Carbon Monoxide:** COHb on gas > 3%, high SpO_2 with arterial hypoxaemia; manage with 100% O_2 via non-rebreathe mask, may require hyperbaric O_2 therapy
- **Cyanide:** Exposure to some burning fabrics; causes persistent lactic acidosis and cardiovascular instability despite fluid resuscitation; manage as per Toxbase guidance

C **Assess VOLUME STATUS - Burns do not usually cause hypovolaemia in the acute phase**
- Secure 2 sites of IV access - consider IO if difficult access or large burn TBSA %
- Perform 12-lead ECG if electrical burn
- Catheterise early to monitor accurate fluid balance
- If requiring > 40ml/kg fluid resuscitation discuss with SORT, consider alternative causes of shock

D **Closely monitor GCS and ensure adequate analgaesia**
- If low or falling GCS, consider alternative causes e.g. head injury, toxicity
- Give early adequate analgesia; paracetamol, opiates, consider ketamine infusion, **avoid NSAIDs**
- Consider alternative routes of administration if limited IV access - PR, intranasal, PO

E **Fully examine and prevent secondary injury (e.g. compartment syndrome)**
- Maintain temperature ~36C
- Ensure secondary survey completed and documented (if unable, clearly hand over)
- Remove any non-adhered clothing and jewellery - if adhered do not attempt to remove
- Limb burns: assess perfusion distal to burn, elevate affected limbs, monitor neurovascular status and discuss early with burns centre if any circumferential wound as may need escharotomy
- Clean and decontaminate cooled burns, photograph if possible prior to dressing (consent)
- Cover with appropriate non-circumferential dressing (specific advice from local burns service)
- Check Tetanus status, antibiotic prophylaxis not generally required

F **Fluid management for burns ⩾ 15% TBSA**
- See box overleaf for calculations

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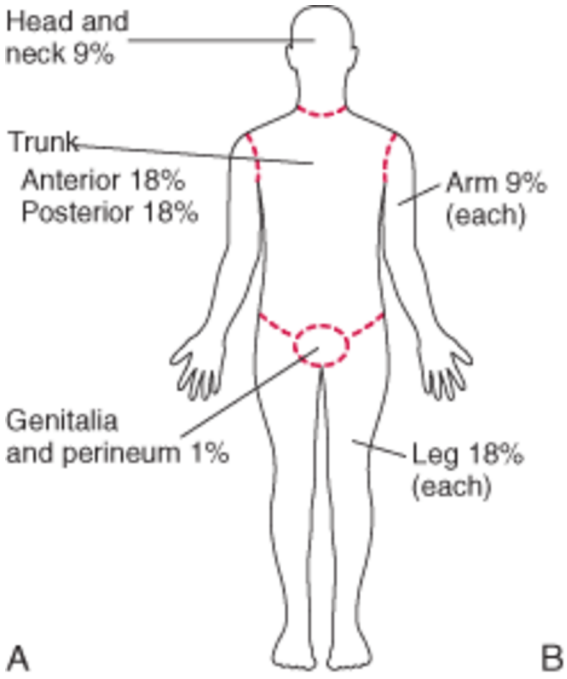
EARLY FIRST AID ADVICE

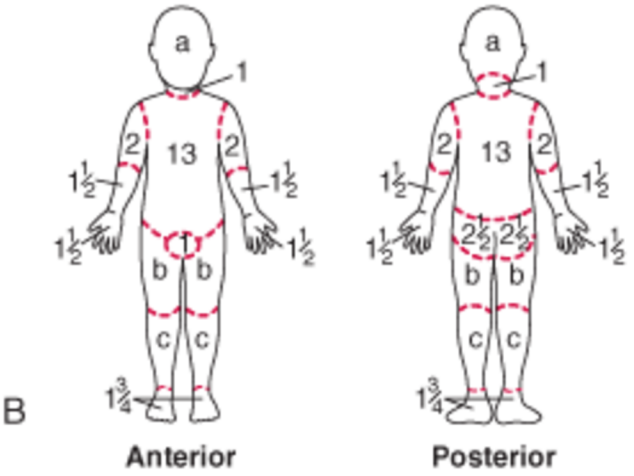
- Cool for minimum of 30 minutes within the first 3 hours of injury, ideally under cool running water
- Analgesia as required and as available pre-hospital
- Loosely cover burn in strips of cling-film for transfer to hospital - do not wrap circumferentially

Lund & Browder Chart for estimating %TBSA



SUPERFICIAL
Blistered, painful, soft, pink, blanches with pressure
** NOT to be included in TBSA % **

DEEP
Pale, charred, red or black, leathery texture, does not blanch



Relative percentage of body surface area (% BSA) affected by growth

	Age				
Body Part	**0 yr**	**1 yr**	**5 yr**	**10 yr**	**15 yr**
a = 1/2 of head	9 1/2	8 1/2	6 1/2	5 1/2	4 1/2
b = 1/2 of 1 thigh	2 3/4	3 1/4	4	4 1/4	4 1/2
c = 1/2 of 1 lower leg	2 1/2	2 1/2	2 3/4	3	3 1/4

FLUID CALCULATIONS

- **Resuscitation Fluid (Modified Parkland Formula) for burns ⩾ 15% TBSA**
  - Weight *(kg)* x TBSA *(%)* x 2 = first 24hr fluid requirement
  - Give half this volume over the first 8 hours then remaining volume over the next 16 hours
  - Calculate boluses given pre-hospital & during resuscitation, subtract this volume from the initial 8 hour resuscitation fluid volume
- **Maintenance Fluid**
  - First 10kg: 4ml/kg/hr
  - Second 10kg: 2ml/kg/hr
  - Additional 1ml/kg/hr for weight >20kg
  - Recommended fluid choice = 0.9% NaCl + 5% Dextrose (For neonates < 28 days use 10% dextrose)

TOXIC SHOCK SYNDROME

- Can occur in any burn, any site, any size
- Consider in any child presenting with fever, rash and diarrhoea plus features of shock following a burn
- See **PIER network guideline** for further guidance on diagnosis and management

Please note: This is a clinical guideline. See separate guidance for minor burns.
Please utilise appropriate referral pathways for Oxford / Southampton patients

SOUTHAMPTON OXFORD RETRIEVAL TEAM

www.sort.nhs.uk

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