

# Emergency Burns Management



- 2001: the National Burn Care Review Committee Report
- Instigated by the British Burn Association
- A need for a coherent national burn care strategy
- Several recommendations
- Acute burn care provision: 175 000 acute burn injuries present in A&E, approx 10% of which require specialist burns inpatient care
- Uniform clinical guidelines for first aid, assessment, treatment and referral criteria
- 2008 London and South East of England Burn Network established to take forward the recommendations

# Definition

- Common form of trauma
- Coagulative destruction of the surface layers of the body caused by extreme heat or other injuring agent
- Scalds
- Flash/flame burns
- Contact burns
- Chemical burns
- Electrical burns
- Radiation burns

# First Aid

- **STOP** the burning process, **COOL** the burn surface
- Flame: extinguish by the patient rolling on the ground, remove hot charred clothing without causing an injury to yourself
- Scald: remove clothing as rapidly as possible
- Remove jewellery
- Cool the surface under running water for 20 minutes but be mindful of hypothermia (children)
- **Never use ice or iced water**
- **Prevent hypothermia at all costs**

# Primary Survey

- **A:** Airway maintenance with cervical spine control: upper airway burns associated with rapid swelling.  
**If in doubt, intubate!**
- **B:** Breathing and ventilation
- **C:** Circulation with haemorrhage control
- **D:** Disability-neurological status
- **E:** Exposure + environmental control
- **F:** Fluid resuscitation proportional to burn size

# Early Management

- Once first aid has been completed, wash the burn (saline, soap and water or Chlorhexidine 0.1% solution) and cover in cling film
- Elevate limbs to limit swelling
- Upper airway compromise-intubation
- Perineum-catheterisation
- Head and neck-elevation
- Escharotomy may be necessary when the burn injury affects entire dermis, skin loses its ability to expand as oedema progresses. E.g. Circumferential burns to trunk or limbs

# Escharotomy

- When the burn injury affects the whole of the dermis the skin loses its ability to expand as oedema progresses
- It may become necessary to release the burn wound surgically by incising the burned skin down to subcutaneous fat
- Consider: full thickness circumferential burns to trunk, full thickness circumferential burns to extremities

# Secondary Survey

- Comprehensive, head to toe examination that commences after life threatening conditions have been excluded or treated
- History (AMPLE)
- Mechanism of injury (duration of exposure, type of clothing worn, temperature and nature of the liquid, adequacy of first aid measures)
- Examination
- Records
- Re-evaluate



## Assessment of Size % TBSA

Palmar surface (area of patient's palm including fingers approx. 1%)

Lund and Browder

Wallace Rule of Nines

IGNORE SIMPLE ERYTHEMA

**% Total Body Surface Area Burn**  
Be clear and accurate, and do not include erythema (Lund and Browder)

REGION	%	
	PTL	FTL
Head		
Neck		
Ant. trunk		
Post. trunk		
Right arm		
Left arm		
Buttocks		
Genitalia		
Right leg		
Left leg		
Total burn		

AREA	Age 0	1	5	10	15	Adult
A = 1/2 OF HEAD	9 1/2	8 1/2	6 1/2	5 1/2	4 1/2	3 1/2
B = 1/2 OF ONE THIGH	2 3/4	3 1/4	4	4 1/2	4 1/2	4 3/4
C = 1/2 OF ONE LOWER LEG	2 1/2	2 1/2	2 3/4	3	3 1/4	3 1/2

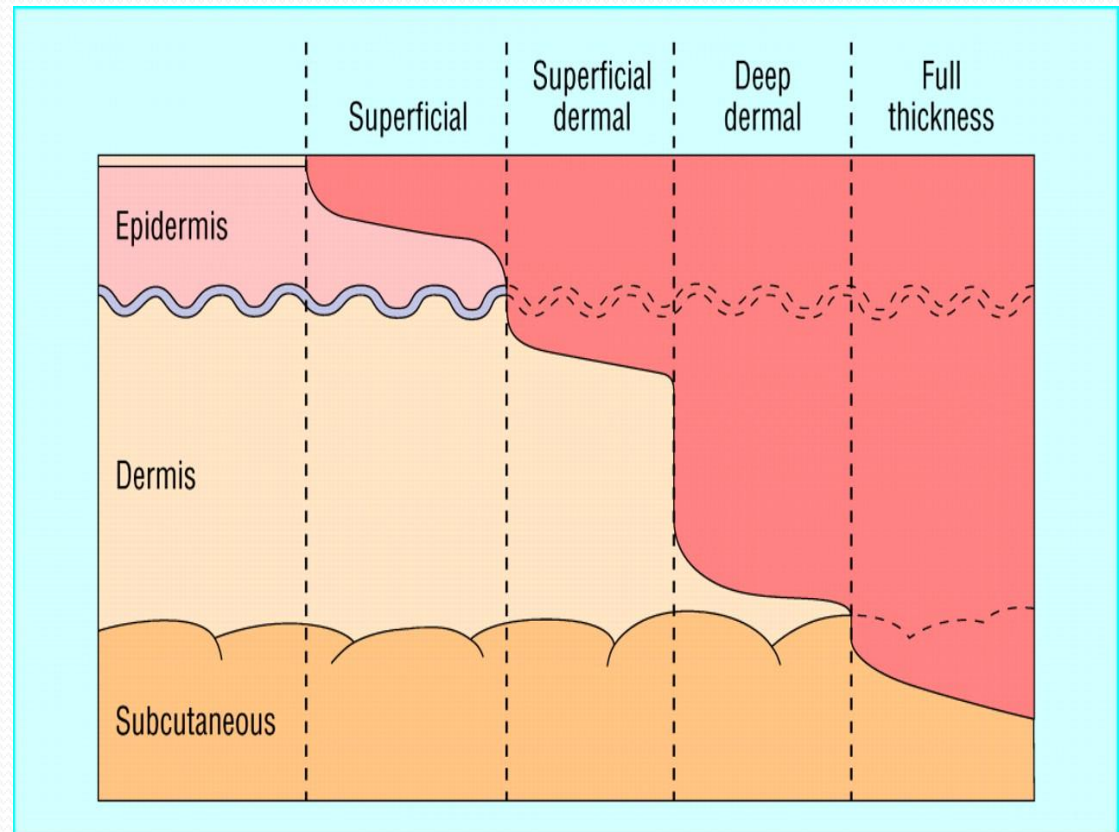
# Assessment of Depth

**Superficial Dermal:** epidermis/part of dermis affected. Brisk blanching, painful, pink, wet

**Mid Dermal:** extends to mid dermis. Slow blanching, painful, less moist, colour variable (red fixed staining-extravasated haemoglobin in the tissues). Hair follicles intact

**Deep Dermal:** extends to deeper layers of dermis. No blanching, colour variable (whitish/cherry red), dull sensation

**Full Thickness:** extends through entire dermis and deeper. No blanching, dry, white and leathery, no sensation. Consider escharotomy if circumferential



# Fluid Resuscitation

- The greater the surface area of the body injured, the greater the mortality rate
- Seriousness of the injury determined by %TBSA and depth
- Oedema + evaporative loss + fluid sequestration into injury site = significant decrease in plasma volume = intravascular hypovolaemia = renal/system failure
- More than **15% in an adult** and more than **10% in a child** = 'SHOCK CASE' = rapid fluid resuscitation

# Fluid Resuscitation Cont.

- The calculation of fluid requirements commences **at the time of injury**, not time of presentation
- IV access: 1-2 cannulae through unburned skin if possible, consider central access and arterial line if patient unstable
- **Hartmann's** is a fluid of choice
- **Parkland Formula** for fluid calculation for adults and paediatric patients

# Parkland Formula

- 4 ml/kg/% TBSA burned from the time of injury over 24 hours.  
Hartmann's a fluid of choice
- 1<sup>st</sup> half given within the first 8 hours from the time of injury
- 2<sup>nd</sup> half in the following 16 hours
- Discuss with Burn Service where fluid overload is a concern (elderly, cardiac)
- Consider adding IV maintenance fluids for children (0.45% NaCl+5% Glucose). See Children's Referral Guidelines
- Monitor adequacy of fluid resuscitation – early catheterisation vital

# Urine Output

- Adults: 0.5 ml/kg/hour (30-50 ml/hour)
- Children: 1 ml/kg/hour
- Urine output near these levels indicate adequate organ perfusion
- Large urine output = excessive fluid resuscitation = unnecessary additional oedema
- Low urine output = poor tissue perfusion and likely cellular injury
- Haemoglobinuria/Myoglobinuria associated particularly with muscle tissue injury (electrocution): urine red, risk of renal failure. Increase output to 1-2 ml/kg/hour

# Electrical Injuries

- **Low voltage** < 1000 V (household, electrical diathermy): will cause significant local contact wounds, may cause cardiac arrest but no deep tissue damage
- **High voltage** > 1000 V (high tension transmission cables): cause flash burns/current transmission with deep tissue damage likely. Continuous cardiac monitoring required.
- **Lightning strike** extremely high voltage
- ABC first-manage associated trauma!
- High fluid requirements (concealed muscle damage)
- ECG, continuous cardiac monitoring
- Transfer to Burns Service

# Chemical Burns

- Industry/household/military
- Progressive damage until inactivated by a neutralising agent or dilution with water
- Copious irrigation necessary
- Acids: coagulative necrosis
- Alkalis: liquefactive necrosis
- Some chemicals cause systemic toxicity: hydrofluoric acid, oxalic, phosphorous burns,...



# Hydrofluoric Acid Burn

- Glass etching, metal cleaning, electronics manufacturing
- After penetrating tissue, hydrofluoric acid dissociates into hydrogen and fluoride ions, of which particularly fluoride is toxic
- A 2% injury can cause death from profound hypocalcaemia
- Cardiac monitor until serum Ca result known
- Larger area involvement: give Ca empirically, involve critical care team

# Transfer

- Stabilise the patient prior to the journey
- O<sub>2</sub> + intubation (if needed) PRIOR to transfer
- IV access+ fluids if needed
- Wash burn and cover with cling film for transfer
- Analgesia
- Discuss with Burn Service re: NBM
- Lower threshold for transfer in children
- Tetanus
- Documentation

# Adult Referral Criteria

- Consider if
- > 3% SPT, DD or FT burns
- All electrical burns
- All chemical burns
- NAI
- All burns to face, hands, perineum, feet
- All circumferential burns (limbs, trunk, neck)
- Inhalation injury
- All burns not healed within two weeks
- Other injuries, co-morbidities, pregnancy, infected burns, any other concerns

## Paediatric Referral Criteria

- Consider if
- > 1% TBSA SPT, DD and FT
- All circumferential burns, burns involving face, hands, soles of feet, 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
- All burns not healed within 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

# LSEBN

- Chelsea and Westminster Hospital (London) 020 3315 2500
- St Andrews Centre, Broomfield Hospital (Chelmsford) 01245 516037
- Queen Victoria Hospital (East Grinstead) 01342 414469
- Stoke Mandeville Hospital (Aylesbury) 01296 315040
- National Burn Bed Bureau 01384 215576
- Children's Acute Transport Service (CATS) 0800 0850003

# Blister Management-Rationale

- Allows assessment of burn wound bed
- Removes non-viable tissue
- Prevents uncontrolled rupture of blister
- Avoids risk of blister infection
- Relieves pain in tense blisters
- Reduces restriction of movement of joints



## Blister Management-Recommendation

- Burn blisters over the size of the patient's little fingernail should be 'deroofed'
- The burn wound should be dressed appropriately with a non or low-adherent dressing
- You refer the patient to your local ED/ burns service if your facility does not have the resources to 'deroof' blisters
- You contact the local burns service to identify training /education needs



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### Debridement



## Deroofing Procedure

- Adequate pain relief
- Mechanically deroof with forceps and scissors aseptically
- Never just puncture blistered skin and leave intact
- Wash with dilute Chlorhexidine solution
- Dress appropriately with low or non adherent primary dressing, gauze, crepe



# More Info

- [www.lsebn.nhs.uk](http://www.lsebn.nhs.uk)
- [www.britishburnassociation.org](http://www.britishburnassociation.org)
- [www.specialisedservices.nhs.uk/burncare](http://www.specialisedservices.nhs.uk/burncare)
- [Eva.Danickova@chelwest.nhs.uk](mailto:Eva.Danickova@chelwest.nhs.uk)

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