HUTT VALLEY DHB

Restoring
Form & Function

Burns

for the College of Emergency Nurses NZ

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Overview

- Mechanism of injury
- Emergency Management
- Local and general response to burn injury
- Burn wound assessment
- Burn wound management

Causes of burns – in Australia and New Zealand (1975-1994)

Adults		Children	
Explosion & Flame	48	Scalds	60
Scald (Oil & Water)	33	Flame	25
Contact	8	Contact	10
Electrical	5	Electrical	2
Chemical	3	Chemical	2
Friction	2	Sun	1
Sunburn	1		

At-Risk Groups

- Young children – 45%
  - Scalds
  - Bath-immersion
  - Pull-over

At-Risk Groups

- Older Children
  - Boys
  - Flammable liquids
  - Fire (works)
  - Electricity

At-Risk Groups

- Elderly
  - Over 75 years
  - Heaters / cookers
  - Scalds
  - Slow reaction time
  - Thinner skin

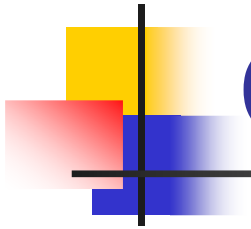
At-Risk Groups

- Pre-disposing conditions
  - Epilepsy
  - Alcohol
  - Drugs
  - Mental disease
    - Self-inflicted burns

Suspicious burn injuries in children

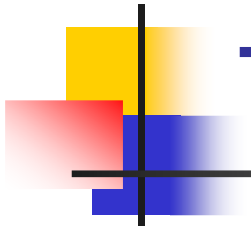
- Any burn injury involving a child
- Burns in a pattern
- History and physical findings inconsistent with the burn injury
- Burn injuries incompatible with child's development level
- Burns to buttocks, perineum, or genitals
- Excessive delay in seeking treatment
- Burns involving immersion into hot tap water
- Multiple old and new burns in different stages of healing
- Presence of splash marks, areas of skin that weren't burned, and burns that are symmetrical in a stocking or glove distribution
- Burns involving the bottom of the feet
- Presence of other non-burn injuries
- Inconsistent or changing story

Fire Injury



Chemical Injury

Inhalation Injury



Thermal Injury

Local response to burn injury

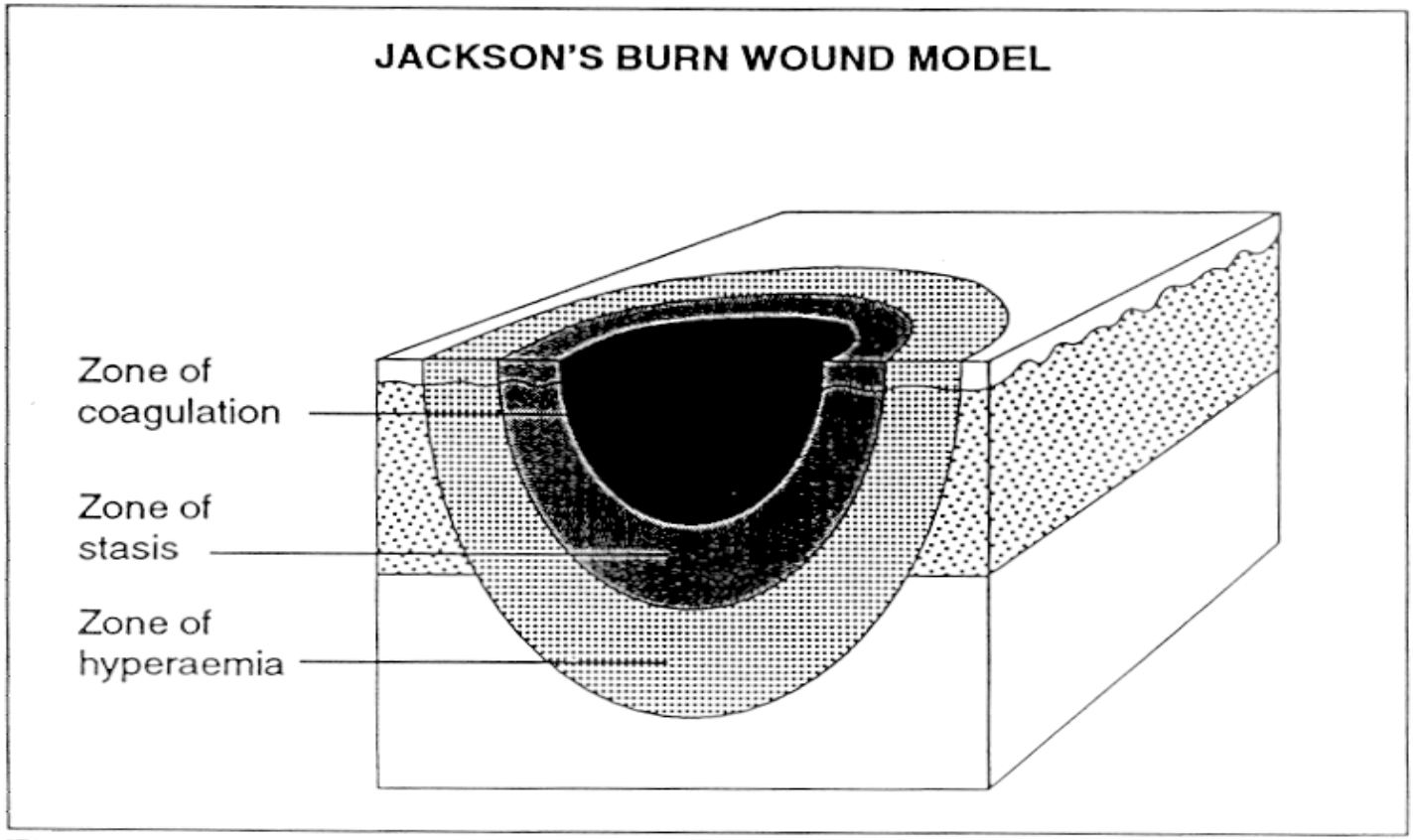


Figure 3.1

Zone of Coagulative Necrosis

- Nearest to the heat source
- The heat can not be conducted away rapidly enough to prevent immediate coagulation of cellular proteins
- There is rapid cell death

Zone of status

- An area of tissue where the damage is less severe than that required to produce immediate cell death
- The circulation in this area of skin and subcutaneous tissue is compromised due to the microcirculation
- The circulation in this area is sluggish

Zone of Hyperaemia

- Zone where damage to the tissues causes production of inflammatory mediators which causes production of inflammatory mediators
- This causes widespread dilatation of the blood vessels

General response to a burn injury

- In a burn greater than 20% TBSA virtually every organ in the body in effected
- Interstitial edema develops in distant organs and soft tissue
- After resuscitation, a hypermetabolic response occurs with near doubling of cardiac output and resting energy expenditure
- The gut, hormone levels, immune responses, lungs are all affected

Referral to Burns Unit

- Burn greater than 10% TBSA in adults
- Burn greater than 5% TBSA in children
- Burns to Special areas – Face, Hands, Genitalia, Joints.
- Full thickness burn greater than 5% TBSA
- Electrical, Chemical burns
- Burn with inhalation injury
- Circumferential burns
- Burns at extremes of age / Burn injury with pre-existing medical disorders / Burns associated with trauma

Determinants of Prognosis

- Depth
  - FT longer to heal / sepsis
  - Muscle / Renal failure
- Area
- Site
  - Perineum / pseudomonas / sepsis
- Age
- Associated injuries
- Treatment and response
  - Fluid / Anti-sepsis / early excision
  - 1 failed organ – 70% mortality

Debriding

- Early tangential excision for deep dermal & full thickness burns –

  delays allow infection to intervene & morbidity & mortality rates rise

Assessment of Area

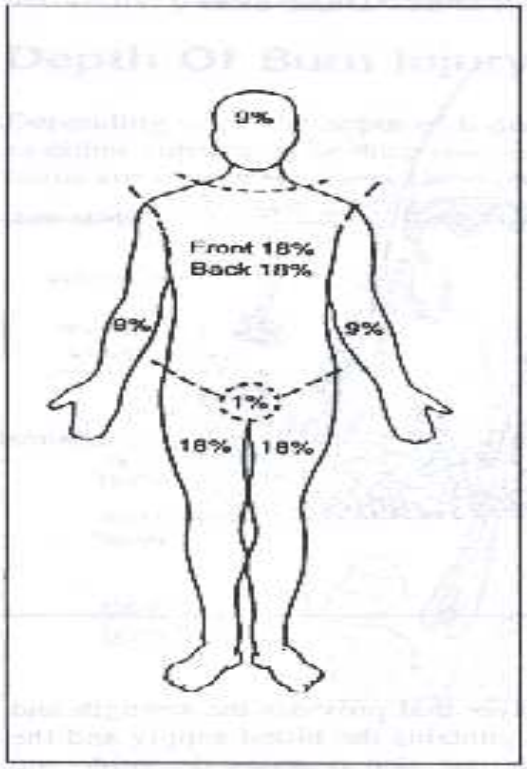


Figure 5.1

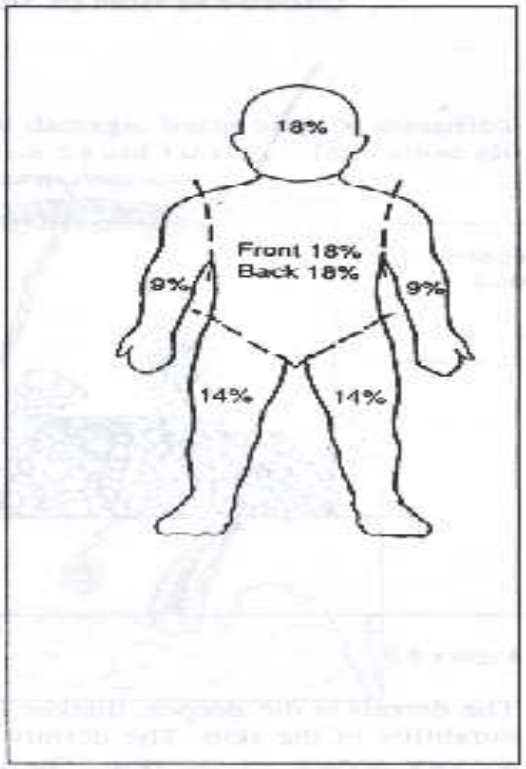


Figure 5.2

Burn Wound Assessment - Diagnosis of Depth

Depth	Colour	Blister	Capillary Refill	Sensation	Healing
Epidermal	Red	No	Present	Present Painful	Yes
Superficial Dermal	Pale Pink	Small	Present	Painful	Yes
Mid-Dermal	Dark Pink	Present	+/-	+/-	Usual
Deep-Dermal	Blotchy Red	+/-	Absent	Absent	No
Full Thickness	White	No	Absent	Absent	No

Epidermal

Example: UV light, very short flash

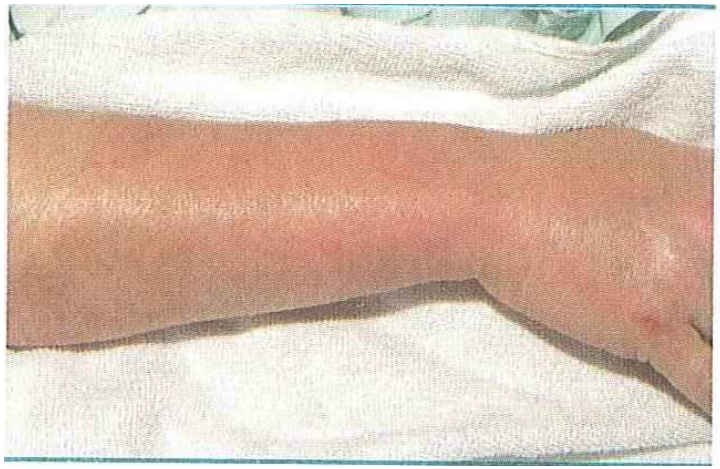
Appearance: Dry and red, blanches with pressure, no blisters

Sensation: may be painful

Healing time: within 7 days

Scarring: no scarring

Treatment: a cream can be used for comfort



(New Zealand Guideline Group, 2007).

Superficial dermal

Example: scald (spill or splash), short flash

Appearance: pale pink with blistering, blanches with pressure

Sensation: usually extremely painful

Healing time: within 14 days

Scarring: no scarring

Treatment: Dressing with antimicrobial should be used on all burns for the first 72 hours

(New Zealand Guideline Group, 2007).

Mid dermal

Example: scald (spill), flame, oil or grease

Appearance: dark pink with large blisters. Capillary refill sluggish

Sensation: may be painful

Healing time: 14-21 days

Scarring: moderate risk

Treatment: Dressing with antimicrobial should be used on all burns for the first 72 hours

(New Zealand Guideline Group, 2007).

Deep dermal

Example: scald (spill), flame, oil or grease

Appearance: blotchy red, may blister, no capillary refill. In children, may be dark lobster red with mottling

Sensation: no sensation

Healing time: over 21 days, grafting usually required

Scarring: High risk

Treatment: usually grafting

(New Zealand Guideline Group, 2007).

Full thickness

Example: scald (immersion), flame, steam, oil, grease, chemical, high voltage electricity

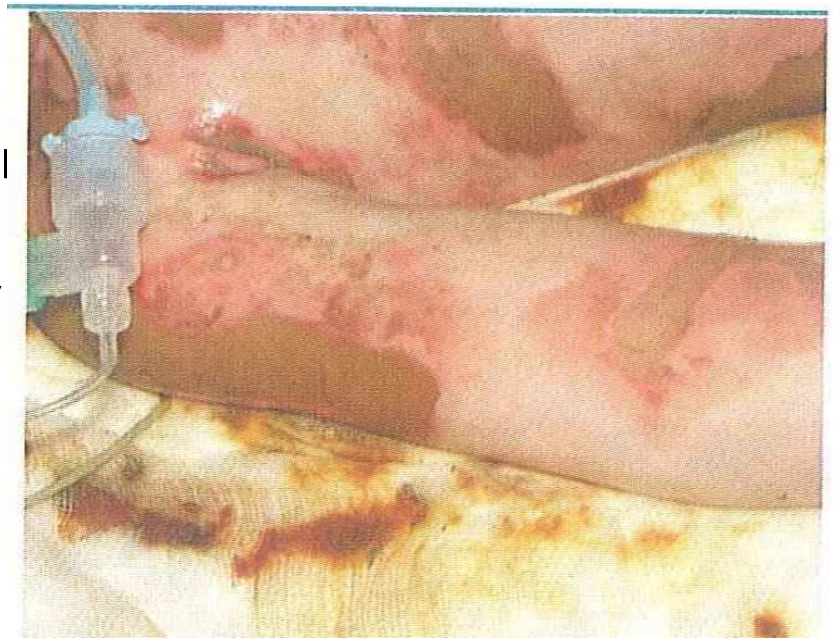
Appearance: white, waxy or charred, no blisters, no capillary refill. In children, may be dark lobster red with mottling

Sensation: No sensation

Healing time: no

Scarring: will scar

Treatment: grafting



(New Zealand Guideline Group, 2007).

The Burn Wound – First Aid

- Stop the burning process
  - Extinguish fire
  - Remove charred clothing
- Cool the Burn wound (< 3 hours after injury)
  - Running cool water – 15^{o}C
  - 20 minutes
  - Avoid hypothermia

PRIMARY SURVEY

- **A -** Airway maintenance with cervical spine control.
- **B -** Breathing and ventilation
- **C -** Circulation with haemorrhage control
- **D -** Disability - neurological status
- **E -** Exposure and environmental control
- **F -** Fluid resuscitation proportional to burn size.

A- AIRWAY MAINTENANCE, CERVICAL SPINE CONTROL

- Clear and open the airway
- Cervical spine control

B - BREATHING AND VENTILATION

- Assess breathing
- ? Ventilate
- **oxygen**
- ? Carbon monoxide poisoning
- Respiratory Rate
- Circumferential chest burns

C - CIRCULATION WITH HAEMORRHAGE CONTROL

- Check the pulse
- Capillary blanch test
- Stop bleeding with direct pressure
- blood loss
- Pallor

D - DISABILITY : NEUROLOGICAL STATUS

- Establish level of consciousness:

- **A - A**lert
- **V -** Response to **V**ocal stimuli
- **P -** Response to **P**ainful stimuli
- **U - U**nresponsive

D - DISABILITY : NEUROLOGICAL STATUS

- Examine the papillary response
- Hypoxaemia and shock

E - EXPOSURE

- Remove all clothes and jewellery
- Keep the patient warm to prevent hypothermia

F - FLUID RESUSCITATION

- Insert 2 large bore, peripheral IV lines preferably through unburned tissue - take blood for : FBC/U&E/Amylase/Carboxyhaemoglobin
- Fluids are given initially as per formula :

  3-4ml Hartmann solution / kg / % burned + maintenance for children

F - FLUID RESUSCITATION

- Area burned is estimated by using the Rule of Nines or a burn body chart.
- Half of the calculated fluid is given in the first eight hours; the rest is given over the next sixteen hours.
- The time of injury marks the start of fluid resuscitation.

F - FLUID RESUSCITATION

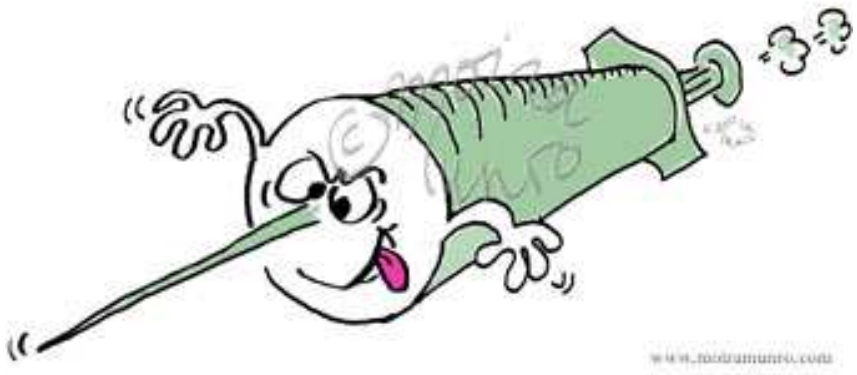
- If haemorrhage occurs from other injuries, replace with blood
- Monitor adequacy of resuscitation with:

  - Urinary Catheter

  - ECG, pulse, BP, respiratory rate, pulse oximetery or arterial blood gas
- Insert nasogastic tube for larger burns or if associated injuries; gastroparesis is common

Dressings

Blisters
– to pop or not to pop?



Management of blisters and oedema

Management of blisters

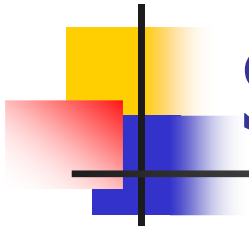
- Preferably leave small blisters intact unless likely to burst or interfere with joint movement
- If necessary, drain fluid by snipping a hole in the blister

Management of oedema

- Where possibly, elevate affected area
- Remove jewellery or constricting clothing

(New Zealand Guideline Group, 2007).

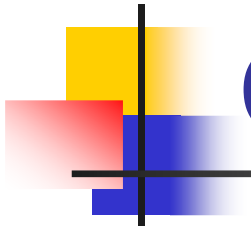
- SSD
- Hydrocolloids
- Transparent films
- Hydrogels
- Alginates
- Hydrofibre
- Foams
- Silver Dressing
- Biobrane



SSD

Acticoat

Biobrane



Grafts