Guideline: Initial Assessment & Management of Burn Injuries

Purpose
- This document provides a guideline for the initial assessment and management of burn patients.
- It is not intended as a full therapeutic manual for burn treatment

Responsibility
- This guideline applies to teams of health professions caring for burn patients.

Content
1. Emergency Assessment and Management of Burn Injuries
2. First Aid and Early Management of Burn Injuries
3. Burn Wound assessment – history, size & depth
4. Fluid Resuscitation
5. Referral Guidelines & Documentation (incl. NBC direct referrals)
6. Burn Wound Management for Transfer
7. Burn Wound Management for Out-patient Care

Important: Contact your Regional Burn Unit with any concerns.

Auckland Regional Burn Unit
(co-located with National Burn Centre), Middlemore Hospital
Ph: 09 276 0000 (ask for on call Plastic Surgery Registrar) / 021 784057
email: plasticreferrals@middlemore.co.nz

Waikato Regional Burn Unit,
Waikato Hospital
Ph: 07 839 8899 (ask for on call Plastic Surgery Registrar)
Fax: 07 839 8725

Wellington Regional Burn Unit,
Hutt Hospital
Ph: 04 570 9999 (ask for on call Plastic Surgery Registrar)
Fax: 04 570 9239 (Plastic and Burn Ward)
email: plastics_referrals@huttvalleydhb.org.nz

Canterbury Regional Burn Unit,
Christchurch Hospital
Ph: 03 364 0640 (ask for on call Plastic Surgery Registrar)
Fax: 03 364 0456 (Dept. Plastic Surgery)

Direct Referral Pathway to National Burn Centre
- Scan & email (oncallburnsnurse@middlemore.co.nz) referral and photographs
- Ring On Call Burn Coordinator (09 250 3800) to confirm receipt of referral
- On Call Burn Coordinator will call back and coordinate communication between referring team and the NBC.

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Counties Manukau District Health Board
# 1. Emergency Assessment and Management of Burn Injuries

<table>
<thead>
<tr>
<th>Step</th>
<th>Action</th>
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<tbody>
<tr>
<td>A</td>
<td>Airway Clear airway; maintain cervical spine protection; consider early intubation if airway compromised. ICU/anaesthetic review PRN. Assess for signs of inhalation injury.</td>
</tr>
<tr>
<td>B</td>
<td>Breathing Apply supplemental oxygen; consider early mechanical ventilation.</td>
</tr>
<tr>
<td>C</td>
<td>Circulation Establish IV access – 2 wide bore short cannulae, preferably through unburnt tissue; control any site of haemorrhage.</td>
</tr>
<tr>
<td>D</td>
<td>Disability Assess level of cognitive function (Alert Verbal Pain Unresponsive); pupillary response to light.</td>
</tr>
<tr>
<td>E</td>
<td>Environment Examine for other injuries, remove jewellery/clothing; keep patient warm</td>
</tr>
<tr>
<td>F</td>
<td>Fluid Fluid resuscitation as indicated proportional to burn size/severity (see below)</td>
</tr>
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**Important:** Primary Survey (i.e. assessment of airway, breathing, circulation, neurological status) must be performed first and takes priority over the burn wound.

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**Important:** Reassessment and constant monitoring is vital as findings will change with burn resuscitation and resultant oedema.

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Consider paediatric, geriatric and psychiatric reviews as appropriate.
2. First Aid and Early Management of Burn Wounds

Important: Appropriate first aid & burn wound management minimises further tissue damage and maximises healing potential.

*Cool the burn wound but keep the patient warm.*

<table>
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<tr>
<td>1.</td>
<td>Ensure room is heated and doors are kept closed.</td>
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<tr>
<td>2.</td>
<td>Remove clothing and jewellery.</td>
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<tr>
<td>3.</td>
<td>Apply recognised first aid: 20 minutes cool running water (between 8–25°C aiming for 15°C). Apply immediately or within the first 3 hours from the burn injury.</td>
</tr>
<tr>
<td>4.</td>
<td>Avoid hypothermia. If &lt;36ºC apply external heating devices.</td>
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</tbody>
</table>
| 5.   | **Cling Film** is a temporary wound covering which will minimise pain, prevent desiccation and allow easy reassessment of the wound. More definitive dressings are covered in the Wound Management Pathway and can be found in the Burn Cache in the E.D.  
  - Do not wrap Cling Film tightly around limbs. Lay it loosely lengthwise along the limbs. |
| 6.   | **Management of Swelling & Escharotomies**  
  - Elevate all burned limbs on pillows as soon as possible.  
  - If the face, head or neck is burned, elevate the head of the bed.  
  - Circumferential burns to limbs require hourly monitoring of the colour, warmth and capillary refill.  
  - Deep circumferential burns may require early escharotomy. If any signs of circulatory compromise, or difficulty breathing in the case of extensive torso burns, escharotomy must be considered – see Escharotomy Guidelines.  
  - Consult with your Regional Burn Unit before completing escharotomies. |
| 7.   | Give adequate analgesia. Morphine as per local policy. Titrate to pain levels. Consult with anaesthetic service for support. |
| 8.   | Give tetanus toxoid / tetanus immunoglobulin as indicated. |
### 3. Burn Wound Assessment

**Important:** Unexplained injuries (non-accidental or intentional) should be considered for all at risk populations AND be referred to the Regional Burn Unit

#### History

| i. | Mechanism and events surrounding injury | e.g. scald, flame, contact, chemical, electrical |
| ii. | Time and place of injury | e.g. how hot, how long exposed |
| iii. | Assess risk of inhalational injury | e.g. loss of consciousness, fall |
| iv. | Assess risk of unexplained injury | e.g. trapped in enclosed space with hot gasses |

#### Estimation of Burn Size

| i. | Use Lund & Browder chart to estimate extent (see Appendix) |
| ii. | Area of patient's palm with fingers extended = 1% TBSA |

#### Burn Depth

<table>
<thead>
<tr>
<th>Depth</th>
<th>Colour of DERMS</th>
<th>Blisters</th>
<th>Capillary Refill</th>
<th>Sensation</th>
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</thead>
<tbody>
<tr>
<td>Epidermal</td>
<td>Red</td>
<td>Epidermis damaged but intact (dry &amp; no blisters)</td>
<td>Present – normal / brisk</td>
<td>Present</td>
</tr>
<tr>
<td>Superficial Dermal</td>
<td>Uniformly Pale Pink</td>
<td>Present – usually small &amp; delayed (hours)</td>
<td>Present – normal / brisk</td>
<td>Painful</td>
</tr>
<tr>
<td>Mid Dermal</td>
<td>Dark Pink or blotchy</td>
<td>Present – usually large &amp; appear quickly</td>
<td>Sluggish +/-</td>
<td>+/-</td>
</tr>
<tr>
<td>Deep Dermal</td>
<td>Blotchy Red or Fixed staining</td>
<td>+/-</td>
<td>Absent</td>
<td>Absent</td>
</tr>
<tr>
<td>Full Thickness</td>
<td>White or black or charred</td>
<td>No</td>
<td>Absent</td>
<td>Absent</td>
</tr>
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</table>
4. Fluid Resuscitation

Intravenous resuscitation required for:
- all adult burn patients with > 20% TBSA injury
- all paediatric patients with > 10% TBSA injury

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<td><strong>Important:</strong> Any patient with a burn size requiring fluid resuscitation must be discussed with your Regional Burn Unit and have hourly urine outputs measured and documented.</td>
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1. **Resuscitation:** Modified Parkland formula

\[ 3 \text{mls Crystalloid} / \%\text{TBSA burned/ kg body weight} \]

Appropriate crystalloid fluids include:
Lactated Ringers, Hartmanns, Plasmalyte

*Avoid Normal Saline as large volumes will result in a hyperchloremic metabolic acidosis*

2. ½ calculated volume in first 8 hrs – from time of burn injury;
½ calculated volume in next 16 hrs – from time of burn injury

3. Monitor urine output and aim for an output of:
- 0.5ml/kg/hr adults; 1ml/kg/hr children.
Urinary catheter should be placed if IV resuscitation required

*Note:* the presence of haemochromogens in the urine (dark discolouration) indicates the presence of muscle and blood breakdown products and requires increasing goal urine output to 1-2ml/kg/hr.

4. Monitor bloods: at least once during each resuscitation period
FBC, Haematocrit; U&E; CoHb

5. For children < 30kg maintenance fluid containing glucose should be administered in addition to resuscitation fluid

6. Colloid 0.3-0.5%/kg/TBSA can be considered:
after the first 18-24hrs, for very large burns, inhalation injury, large paediatric burns
5. Referral Guidelines

Direct Referral Pathway to National Burn Centre

- Complete referral form –
- Scan & email (oncallburnsnurse@middlemore.co.nz) referral and photographs
- Ring On Call Burn Coordinator (09 250 3800) to confirm receipt of referral
- On Call Burn Coordinator will call back and coordinate communication between referring team and the NBC.

Referral criteria for the National Burn Centre (any of the following)

- Burns greater than 30% total body surface area
- Full thickness burns to the face, hands, feet, genitalia or perineum
- Burn Injury with significant inhalation injury
- High voltage electrical burns
- Significant chemical burns

Referral criteria for a Regional Burn Centre (any of the following)

- Burn > 10% TBSA in an adult. Burn >5% TBSA in a child
- Full thickness burn >5% TBSA in either adult or child
- Burns of special areas: face, hands, feet, perineum
- Electrical Burn
- Chemical Burn
- Burn associated with an inhalation injury
- Circumferential burns of limbs/ chest
- Burn at the extremes of age (e.g. <2yrs or > 70yrs)
- Associated trauma
- Any unexplained injury
- Burn injury in patients with pre-existing medical disorders that could complicate management, prolong recovery or increase mortality
- Any burn which has failed to heal with conservative management after 10 days

Important: Contact your Regional Burn Unit with any concerns or questions about any burn injuries or treatment.

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  Ph: 03 364 0640 (ask for on call Plastic Surgery Registrar)
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### 6. Burn Wound Management for Transfer

**Important:** Burn wounds are initially sterile and routine use of systemic antibiotics is not advised. Please discuss all wound management with the receiving team. Every Emergency Department should have a Burn Cache with dressing products for initial coverage of wounds for transfer. **PATIENT MUST BE KEPT WARM.**

1. Debride all loose skin, clean wounds with aqueous chlorhexidine with appropriate analgesia

2. Blisters
   - leave small blisters intact
   - debride blisters over joints or if restricting movement
   - snip large, tense blisters
   **Debrided blisters must be covered with a dressing and not left exposed.**

3. If transfer time to reach the Burn Centre is
   - within 8 hours – cling film is an acceptable temporary transport dressing
   - within 24 hours – simple dressings – non-adherent layer against wound + secondary absorbent & protective layer
   - beyond 24 hours – consider applying an antimicrobial dressing *after* consultation with the receiving Burn Unit

4. Face
   - elevate head of bed if possible
   - apply a thin layer of ointment (e.g. paraffin or (prescribed) antibiotic ointment) to the face & emollient (e.g. vitamin A) to lips.
   - facial cares should be undertaken every 2 hours and ensure the face is thoroughly cleaned between each application.

5. Eyes
   - irrigate gently with saline
   - fluorescein to identify corneal injury
   - copious irrigation for chemical injury
   - antibiotic ointment
   **All ocular injuries should have an ophthalmological review**

6. Limbs
   - elevate and monitor for any compromise to circulation – neurovascular observations of extremities as required
   - primary dressings are to be placed in a longitudinal fashion
   - secondary (absorbent) dressing should be sufficient to manage wound exudate
   - secure/fix dressings with loose bandage to accommodate any further swelling

**Important:** Toxic Shock Syndrome can develop rapidly even in very small paediatric burns. Maintain a high level of suspicion. If in doubt remove all dressings and commence appropriate treatment early
7. Burn Wound Management for Out-patient Care

Important: Contact your Regional Burn Unit with any concerns or questions about any burn injuries or treatment.
Any burn wound not healed by 10 days should be referred to a Regional Burn Unit

- Ensure appropriate community-based wound management plans are made (e.g. returning to ED, referral to GP or referral to community nursing team). This will be dependent on resources available
- Considerations include access to potentially specialised wound care products, pain management

Admission into any hospital is typically based around one of the following:
1. The need for wound care which cannot be delivered as an outpatient (i.e. frequent or complex dressing issues)
2. Analgesic requirements too great to be managed as an outpatient (i.e. ongoing narcotic analgesia requirement or failure to manage dressing-change pain)
3. Functional, social and/or psychosocial indicators requiring rehabilitation or specialist services (i.e. physiotherapy, occupational therapy)
4. Concerns over progression of the burn injury and or its sequelae (i.e. oedema compromising circulation or airway)

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New Zealand National Burn Service

Referral to National Burn Centre

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   or fax to (09 276 0114)

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www.nationalburnservice.co.nz

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