Health New Zealand
Te Whatu Ora
Counties Manukau

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

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)
Wellington Regional Burn Unit, Hutt Hospital	Ph: 045666999 (ask for on call Plastic Surgery Registrar)
Canterbury Regional Burn Unit, Christchurch Hospital	Ph: 03 364 0640 (ask for on call Plastic Surgery Registrar) 027 2127346

Direct Referral Pathway to National Burn Centre

- **Complete referral form –** **http://www.nationalburnservice.co.nz/pdf/referralform.pdf**
- **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.**

Emergency Assessment and Management of Burn Injuries

Important: **Primary Survey (i.e., assessment of airway, breathing, circulation, neurological status) must be performed first and takes priority over the burn wound.**

Step	Action	
A	Airway	Clear airway; maintain cervical spine protection; consider early intubation if airway compromised. ICU/anaesthetic review PRN. Assess for signs of inhalation injury.
B	Breathing	Apply supplemental oxygen; consider early mechanical ventilation.
C	Circulation	Establish IV access – 2 wide bore short cannulas, preferably through unburnt tissue; control any site of haemorrhage.
D	Disability	Assess level of cognitive function (Alert Verbal Pain Unresponsive), pupillary response to light.
E	Environment	Examine for other injuries, remove jewellery/clothing; keep patient warm.
F	Fluid	Fluid resuscitation as indicated proportional to burn size/severity (See below).

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

Consider paediatric, geriatric and psychiatric reviews as appropriate.

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.

Step	Action
1.	Ensure room is heated and doors are kept closed.
2.	Remove clothing and jewellery.
3.	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.
4.	Avoid hypothermia. Actively warm, aim for >37°C
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.

Burn Wound Assessment

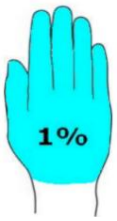
Important: Unexplained injuries (non-accidental or intentional) should be considered for all at risk populations AND be referred to the Regional Burn Unit

History

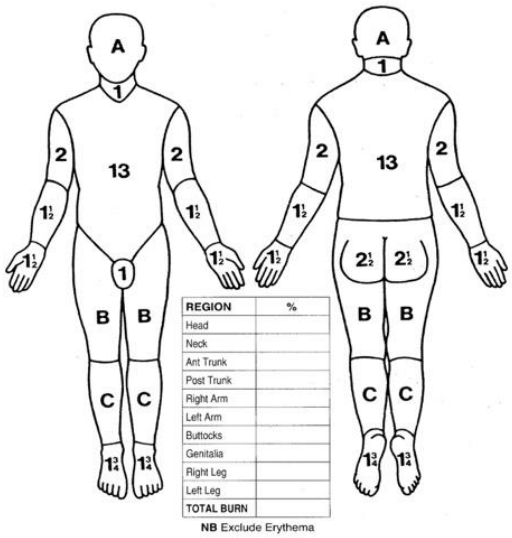
i.	Mechanism and events surrounding injury	e.g., scald, flame, contact, chemical, electrical e.g., how hot, how long exposed e.g., loss of consciousness, fall
ii.	Time and place of injury	
iii.	Assess risk of inhalational injury	e.g., trapped in enclosed space with hot gasses
iv.	Assess risk of unexplained injury	e.g., delay in seeking medical attention e.g., inconsistency between history and wound appearance e.g., pattern of injury (symmetry, contact, glove & stocking pattern)

Estimation of Burn Size

i.	Use Lund & Browder chart to estimate extent (see Appendix)
ii.	Area of ***patient's*** hand including fingers = 1% TBSA



Patient's palm with closed fingers = 1% TBSA



Area	Age 0	1	5	10	15	Adult
A=½ of head	9½	8½	6½	5½	4½	3½
B=½ of one thigh	2¾	3¼	4	4¼	4½	4¾
C=½ of one leg	2½	2½	2¾	3	3¼	3½

Burn Depth

Depth	Colour of DERMIS	Blisters	Capillary Refill	Sensation
Epidermal	Red	Epidermis damaged but intact (dry & no blisters)	Present – normal / brisk	Present
Superficial Dermal	Uniformly Pale Pink	Present – usually small & delayed (hours)	Present – normal / brisk	Painful
Mid Dermal	Dark Pink or blotchy	Present – usually large & appear quickly	Sluggish	+/-
Deep Dermal	Blotchy Red or Fixed staining	s+/-	Absent	Absent
Full Thickness	White or black or charred	No	Absent	Absent

Fluid Resuscitation

Intravenous resuscitation required for:

- **All adult burn patients with > 20% TBSA injury**
- **All paediatric patients with > 10% TBSA injury**

Important: **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.**

1.	Resuscitation: **Modified Parkland formula** **3mls balanced crystalloid / %TBSA burned/ kg body weight** Appropriate balanced crystalloid fluids include: Lactated Ringers, Hartmanns™, Plasma-Lyte *Avoid Normal Saline as large volumes will result in a hyperchloraemic metabolic acidosis*
2.	Give ½ of calculated volume in first 8 hrs – from time of burn injury; Give other ½ of calculated volume in next 16hrs – 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 haemochromagens 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 < 16 years old, constant maintenance fluid containing glucose should be administered **in addition** to resuscitation fluid (5% Dextrose with normal (0.9%) saline)
6.	Colloid (4% Albumin. Not synthetic Colloid) 0.3-0.5%/kg/TBSA can be considered after the first 18-24hrs, for very large burns, inhalation injury, or large paediatric burns.

Referral Guidelines

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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.**

Burn Wound Management for Transfer

Important: **Burn wounds are initially sterile and routine systemic antibiotics should not be used.**

Please discuss all wound management with the receiving team. Do not use silver dressings unless discussed with Regional Burn Unit

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 • **< 8 hours** – cling film is an acceptable temporary transport dressing • **8 - 24 hours** – simple dressings – non-adherent layer against wound + secondary absorbent & protective layer • **> 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 (consider Diphoterine® solution if available) • Antibiotic ointment *All ocular injuries should have an ophthalmological review*
6.	Limbs • Elevate and monitor for any compromise to circulation – perform neurovascular observations of extremities as required. • Primary dressings should be placed in a longitudinal fashion (non-circumferential). • Secondary (absorbent) dressing should be sufficient to manage wound exudate. • Secure/fix dressings with loose bandage to accommodate any further swelling.

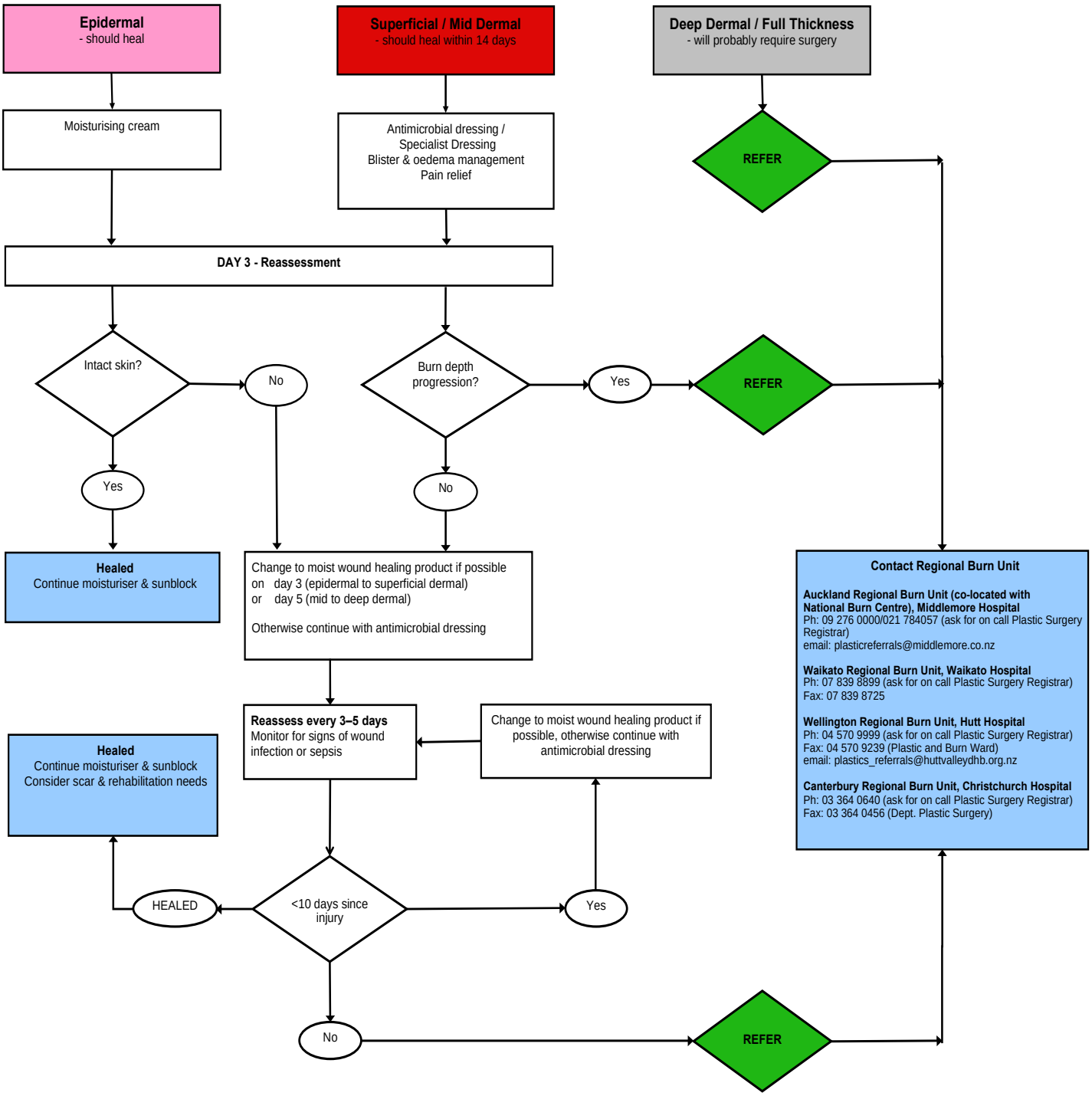
Important: **Toxic Shock Syndrome can develop rapidly even in very small paediatric burns. Maintain a high level of suspicion. If in doubt remove all dressings and commence appropriate treatment early**

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 that could compromise airway or circulation).**
5. **Consider referral to Regional Burn Unit for any patient requiring admission.**

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New Zealand National Burn Service

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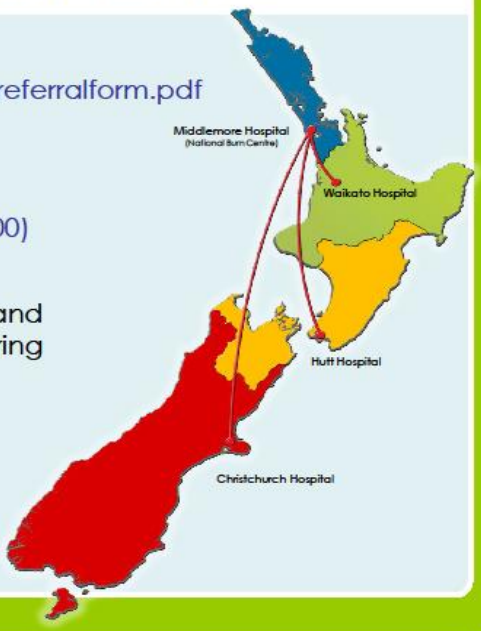

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